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A Comparison of Feedback Provided Through Live Video Streaming and Post Video Conferencing on the Treatment Integrity of Individuals Pursuing a Board Certification in Behavior Analysis

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by

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Dissertation

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Doctor of Philosophy

The University of Texas at Austin

May 2017

Acknowledgements

This is a difficult page to begin, as there are so many people without whom this would not have been possible. First and foremost I feel truly blessed and grateful to have the parents I do. My brothers and I always grew up with them telling us, "an education is something no one can take away from you," which is a saying I hold dear to me to this day. Without their constant love, support, and encouragement none of this would have been possible. I thank you for everything you both have done and continue to do.

Just as importantly, Tony Kuhn, who continues to amaze me everyday with his constant love and support. I am truly in awe of you and do not know how I am so blessed to have you in my life. Throughout this journey you have supported, inspired, and cared for me. You have been my sounding board, my rock, and my light. I am thankful to always have you as an inspiration and look forward to trying to be the same for you as our journey continues. I also am so thankful for Hunter, who without knowing it, made me smile when I needed it, and pushed me to continue whenever I felt challenged.

To my advisor, Mark O'Reilly, who I am in amazement of having worked under. You have an incredible ability to teach without me realizing how much I am learning in the moment. From instilling a sense of research in me, to providing me the esteemed responsibility of running your partnerships, I believe I am a stronger teacher, clinician, and researcher because of you. You constantly pushed to make me better, and for this I am eternally grateful.

I also feel extremely fortunate to have been able to work with such an incredible committee. Dr. Terry Falcomata, Dr. Amanda Little, Dr Micheal Sandbank, and Dr. Jeff Sigafoos, thank you from the bottom of my heart. Your assistance and devotion to this

project has more meaning to me than you are probably even aware. I constantly tried to think about how each of you would react to every step of this along the way, and I feel that it constantly pushed me in a more positive direction.

Last, but certainly not least, I would like to thank my colleagues and friends for their contribution to not only this project, but for helping me through the years. Nicolette Sammarco Caldwell, I do not even know what to say. One of the best parts of this program has been getting the opportunity to meet you. This project would not exist if it were not for you, nor would even getting to this step. Thank you is not a strong enough word to convey my gratitude. I look forward to continuing to work together in years to come. To Laci Watkins, who always helped to lead the way and make me feel this was possible. Your friendship and assistance throughout this program has been invaluable. To Cayenne Shpall, thank you for your friendship and for being willing to talk about behavior analysis at any time of day. To Nataly Lim, Katherine Ledbetter-Cho, Claudia Zamora, Dr. Laura Rojeski, and Dr. Cindy Gevarter, all of who have been so tremendous to know and work with. I will forever be grateful for knowing all of you.

A Comparison of Feedback Provided Through Live Video Streaming and Post Video Conferencing on the Treatment Integrity of Individuals Pursuing a Board Certification in Behavior Analysis

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The University of Texas at Austin, 2017

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As an increased number of individuals are receiving diagnoses of ASD, there is a greater need for certified service providers (Benevides, Carretta, Lane, 2016). With this increased need comes challenges in the appropriate training and supervision of providers, which decreases occurrences of the use of evidence based practices (Kabot, Mase, & Segal, 2003). Growing technology may be one solution to assist in the supervision outreach and improvement, as it has been successfully used for this purpose in other fields (Rousmaniere et al., 2014; Panos et al., 2002). The purpose of this study was to evaluate the use of performance feedback provided through teleconferencing solutions including live streaming and video conferencing with screen sharing on the acquisition and maintenance of preference assessment procedures on masters' students in the field of special education pursuing their BCBA. A simulated client was used in the training of students. A multiple baseline

design across participants with an embedded multielement design was utilized to evaluate the effects of feedback based on the percentage of preference assessment procedures implemented correctly. Results indicate that feedback provided through both live streaming and post session videoconference with screen sharing were effective methods for training individuals to conduct preference assessments. Additionally, results generalized to working with individuals with ASD with out the provision of feedback and maintained at four and six weeks post intervention. Additionally, each participant rated the use of all teleconferencing strategies, feedback procedures, and the outcome of the training positively. Further discussion of the results of the study, limitations, and directions for future research are provided.

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CHAPTER 1: INTRODUCTION

With the number of individuals diagnosed with autism spectrum disorder (ASD) on the rise, the need for service is increasing (Hertz-Picciotto & Delwiche, 2009; Baird et al., 2006; Simonoff 2012). This need aids in creating challenges for families seeking services. Accessibility to services, funding for services, and qualified service providers are only some of the limitations families have in obtaining treatments for their children with ASD (Dymon, Gilson, Myran, 2007). Additionally, education of service providers and access to evidence based practices can create supplementary barriers in obtaining quality services (Kabot, Masi, & Segal, 2003).

These obstacles can often lead to individuals not receiving any services, receiving only part of the services they need, or obtaining services that do not have an evidence base (Hess, Morrier, Heflin, & Ivey, 2007). Additionally, the continued need for individuals to work in the field could lead to a situation where staff do not have knowledge of or are not implementing evidence-based practice (Stahmer, Collings, & Palinkas, 2005). With research showing that considerable advances can be made for children with ASD when effective treatment is provided early, the impact of not receiving these services could be detrimental (Lovaas, 1987; Green, Brennan & Fein, 2002; Dawson et al. 2010; McGee, Morrier, & Daly, 1999).

The field of applied behavior analysis (ABA) is one of the only therapeutic practices for ASD with scientific based support (Deyro, Simon, & Guay, 2016). This has created a rise in individuals pursuing their board certification in behavior analysis (BCBA). In 2004 there were approximately 3200 BCBAs and board certified assistant

behavior analysts (BCaBAs; Guercio & Murray, 2014). In just 12 years that number has grown to approximately 23,080 BCBAs and BCaBAs which averages to over 1,500 new BCBAs and BCaBAs a year (bacb.com, retrieved 9/10/16). The increase in those pursuing their BCBA includes individuals new to the field, families seeking credentials after having a child with ASD, and practitioners in other fields adding a BCBA to other previously held certifications (Guercio & Murray, 2014; Schreck & Mazur, 2008).

According to the BACB (2016), for one to become a BCBA, there are a variety of options including obtaining a graduate degree in the field of behavior analysis, education, or psychology from a qualified accredited institution, completing coursework that covers the required content from the BACB's 4th Edition Task List and Course Content Allocation documents, or completing at least 3 years of fulltime work as a faculty member at a qualified accredited institution while teaching behavior analytic coursework and publishing an article relevant to the field. In addition all applicants need to receive supervised experience that complies with the BACBs experience standards, as well as pass an examination. The supervision requirement most often includes a minimum of 1500 hours of independent fieldwork where students are in a non - university - based placement or practicum setting with a minimum of 5% of their hours being supervised by a current BCBA (Gadke, Stratton, Kazmerski, & Rossen, 2016). Less common supervision options include a practicum and intensive practicum that necessitate the completion of 1000 and 750 hours respectively from within a university practicum that is approved by the BACB (2016).

In order to continue to provide high standards of care to those with ASD it is imperative that the standards of certification remain high. The behavior analyst certification board (BACB; 2016) has been working to keep up with the increases in the field by updating many components of the certification including their eligibility requirements, ethics code, and supervision requirements. As of January 2015, the BACB created the requirement that all supervisors pass an 8-hour, post-certification, competency-based training on effective supervision, pass an online, competency-based training module on BACB experience standards, and earn at least three continuing education hours in supervision every two year cycle for BCBA supervisors (The BACB Newsletter - Special Edition on Supervision, 2012). Additionally, supervisee's are required to pass an online, competency-based training module on BACB experience standards (The BACB Newsletter - Special Edition on Supervision, 2012).

While the new standards were created to assist in maintaining a high level of certified individuals, the standards combined with the increased number of people seeking certification may create challenges in ensuring high quality supervision (Hartley, Courtney, Rosswurm, LaMarca, 2016). This may also impact the ability of individuals in other disciplines to obtain their BCBA as well as those in remote areas (Donaldson, 2014; Young-Pelton, 2013). Additionally, many universities only provide the required coursework for one to sit for their BCBA examination, but do not provide university supported supervision programs that coincide with that work (Young-Pelton, 2013). Across all autism certification programs, only about 38% require a practicum component

where students would work with individuals with ASD under a licensed professional (Klein, Jenson, & Vincent, 2013).

Many programs are beginning to utilize online education as a forum for providing the course work for the BCBA certification. There are currently at least 30 universities providing this service (Online/Distance Graduate Programs to Meet BCBA Requirements, 2013). While research has found no significant difference in student academic performance for special education courses delivered through distance education and in person, a concern has grown that the application of this material may be challenged by some learners without interaction between their professor and peers (Steinweg, Davis, Thomson, 2005). Without concerns of applying the current literature to practice there is an increased risk for students to be less prepared than those who come from a program that incorporates research and application into its educational agenda (Dixon, Reed, Smith, Belisle, & Jackson, 2015). Additionally, this gap can impact the attitudes of providers towards using evidence-based practices (Stahmer & Aarons, 2009).

New developments in technology may, however, allow for increased opportunities for supervision for individuals in school or training. The fields of psychotherapy, social work, and medicine all have begun using video conferencing and other telecommunication strategies to supervise those working to be in the field (Rousmaniere, Abbass & Freder, 2014; Panos, Panos, Cox, Roby, & Mathison, 2002; Xavier, K., Shepherd, L., Goldstein, D. 2007). Multiple supervision modalities have been utilized including videoconferencing for individuals and groups, use of videoconferencing as a live one-way mirror, use of file transfers for sharing of videos and

other materials, and use of continuous assessment software to name a few (Hilty, Luo, Morache, Marcelo, & Nesbitt, 2002; Rousmaniere & Frederickson, 2013; Rees, Krabbe, & Monahhan, 2009; Weingardt, Cucciare, Bellotti, & Lai, 2009). The use of various modalities allows for flexibility in determining the supervision methods that work best for each field or individual practitioner, but other modalities are yet to be evaluated. For example, while the co-watching of student videos between the supervisor and supervisee as a method for providing feedback is a widely used strategy, the literature on this topic has a strong qualitative focus which necessitates research to quantitatively determine its effectiveness (Bahar, 2011; Pinter, East, & Thrush, 2015; Noordman & Verhaak, 2011).

In the field of special education, technology has been used to assess and treat individuals with ASD. A review of the use of telepractice found the majority of studies using these platforms to be successful in their implementation (Boisvert et al., 2010). Services delivered through these modalities varied and included the use of telepractice for conducting functional analyses and preference assessments, training teachers, therapists, or parents to implement interventions, providing consultation and evaluations to a clinic serving Native American youth on their reservation, as well as consultation on the development of individualized education plans (Boisvert et al., 2010). While there is promising evidence for the use of technological platforms in the field of special education, more research needs to be done in order to extend the results of previous studies in various ways.

One specific need is in the training and supervision of individuals working in the field, as empirical work on supervision in the field of ABA is lacking. Specifically, when

providing supervision and training to individuals working towards obtaining their BCBA it is important that the BACB 4th Edition Task List is adhered to. Observance to this task list is important as it outlines the necessary skills and knowledge BCBA candidates need to pass the examination and to appropriately apply practice. This task list includes basic behavior analytic skills, client-centered responsibilities, and foundational knowledge (Behavior Analyst Certification Board, 2012).

One example of teaching towards the task list is assisting individuals in the delivery of preference assessments. Preference assessments are often utilized to determine favored items in children with ASD and each assessment type requires a chain of responses that vary across forms, but are similar in complexity across methods (Roscoe, Fisher, Glover, & Volkert 2006). Teaching various preference assessments would be appropriate for researching new supervision strategies, as the use of feedback has been found to be a successful method in teaching these skills, but the timing of the feedback and modality used has yet to be evaluated (Roscoe et al., 2006; Roscoe & Fischer, 2008).

While the current literature lacks rigor in an exact methodology for providing clinical supervision, it is important that research determining the effectiveness of different supervision platforms continues to use appropriate and effective supervision models based on the existing research (Ellis, Ladany, Krengel, & Schult, 1996). Twenty-six supervision procedures have been determined to be effective including direct training, feedback, observing, goal-setting, question and answer, modeling, planning, reinforcement, discussion, prompts, role-play, explanation, monitoring, review,

summarizing, challenging, self-monitoring, listening, problem-solving, rehearsing, self-disclosure, collaborating, confidence building, disagreeing, and modeling problems (Milne, Aylott, Fitzpatrick, & Ellis, 2008). While all aspects of these interventions may or may not be appropriate in every situation, models utilizing these elements can be an effective supervision strategy. One such model, as developed by O'Reilly and colleagues (1992), includes interrupting assessment, indicating an error, and asking the individual how they may remedy the error if an error occurs. If the individual correctly responds, the supervisor gives positive feedback and tells them to proceed, if the teacher responds incorrectly, the supervisor describes the procedure and models the correct action as needed. Finally, the supervisor provides praise at the end of each procedure performed correctly. This model encompasses components of effective clinical training strategies, and has been found successful in pre-service teacher training (O'Reilly et al., 1992; Machalicek et al., 2009).

The purpose of this dissertation is to further the research on clinical supervision as well as the use of telecommunication and clinical training strategies. First, this study will evaluate the use of live video streaming as compared to screen shared watching of student performance on the teaching of various preference assessments. Second, this study will evaluate the generalization and maintenance of these skills as well as the social validity of using a telecommunication model.

CHAPTER 2: REVIEW OF THE LITERATURE

With one in every 68 children receiving a diagnosis of autism spectrum disorder (ASD), the need for appropriate services increases as well (Centers for Disease Control and Prevention, 2014). Compared to other children with special health care needs, families of children with ASD are 1.4 times more likely to report an unmet need for therapy (Benevides, Carretta, Lane, 2016). This lack of services only increases for individuals in nonmetropolitan areas, of minority ethnicity, of low parental education levels, or of low socioeconomic status (Nguyen, Krakowiak, Hansen, Hertz-Picciotto, & Angkistsiri, 2016; Magana, Lopez, Aguinaga, & Morton, 2013; Alegria et al., 2007; Thomas, Ellis, McLaurin, Daniels, & Morrissey, 2007). This awareness of unmet services suggests an importance of finding new ways to ensure that proper therapies are being delivered to all who need it.

In order to assist their children's development, many parents are beginning to take on the role of therapist for their children (Patterson, Smith, & Mirenda, 2011). Additionally, with mandates such as the Individuals with Disabilities Education Act (IDEA, 2004), an increasing number of general education teachers are responsible for the instruction of children with ASD (Loiacono, Valenti, 2010; Arthaud, Aram, Breck, Doelling, & Bushrow, 2007). However these same parents and teachers often receive zero to minimum training in evidence based practices in working with individuals with ASD (Hayes, Casey, Williamson, Black, & Winsor, 2013; Scheuermann, Webber, Boutot, Goodwin, 2003). This gap between who is providing services and who is trained in evidence-based practice creates a challenge in the provision of best services.

The increasing capacities of new technologies have improved the availability and use of training and supervision via telecommunication services (Rousmaniere, Abbass, & Frederickson, 2014; Perle, Lansam, Nierenberg, 2011). Beyond the scope of special education this platform has been used for education and preparation of individuals in various fields including, but not limited to medicine and nursing, general education, psychology, and military services (Chipps, Brysiewcz, Mars, 2012; Gray, Ryan, Coulon, 2004; Perle, Lansam, Nierenberg, 2011; Bramble & Martin, 2009). Additionally, positive findings for the use of telecommunication have been found across fields (Chipps, Brysiewcz, Mars, 2012; Gray, Ryan, Coulon, 2004; Perle, Lansam, Nierenberg, 2011; Bramble & Martin, 2009). These technologies may then allow for the capabilities to positively serve more individuals by eliminating restrictive factors to services such as distance, time, and lack of culturally or linguistically matched service providers

Previous reviews looking at the use of telepractice with individuals with ASD focused on the various capacities of telecommunication including assessment and treatment (Boisvert, Lang, Andrianopolous, Boscardin, 2010), or have looked specifically of its use within a specific model including early intervention (Meadan & Daczewitz, 2015). While both reviews found positive results for the use of these practices, as the technology and use of telecommunication increases, it is important to look more specifically at how these technologies are working for training individuals to work with those with ASD to assist in lessening the gap between need and service provision.

The following review aims to provide a comprehensive review of the literature utilizing telecommunication to train parents, teachers, staff, therapists and caretakers of individuals with ASD to provide therapeutic instruction or assessment.

Method

Studies that concentrated on training individuals to conduct assessments or interventions with children with ASD via streaming technology (i.e., teleconferencing, video chat, etc.) were evaluated. A search was conducted using Educational Resources Information Center (ERIC) and PsychoINFO databases. The search was limited to English language publications in peer-reviewed journals. Studies were located using the term *autis** as a stable search term while interchanged with *remote*, *tele* and *distance*. Three hundred and ninety articles were identified through the initial search. After examination of the titles and abstracts, 24 studies using video streaming technology to train parents, teachers, or professionals to work with individuals with ASD were identified for closer inspection.

Inclusion and Exclusion Criteria

Articles included in this review contained a component of training families or professionals to work with individuals with ASD. Studies looking only at the assessment or treatment of children with ASD without training someone else via video streaming to conduct the assessment or treatment were excluded (e.g., Parmanto, Pulantara, Schutte, Saptono, & McCue, 2013). Also, studies using video conferencing to observe or reinforce without providing training were excluded (e.g., Machalicek et al., 2009). Additionally, studies that included components of in person training and video training

without segregation of the results to determine which components were effective were excluded in order to look specifically at results determined via telepractice (e.g., Gibbs & Toth-Cohen, 2011; Wainer, Pockard, Ingersoll, 2017).

Finally studies must have been written in the English language and used an experimental research design in order to directly analyze the effect of the intervention on participant behavior (i.e., single case design or group design). Studies that did not utilize an experimental design were excluded. Of the 24 studies identified, 15 met the inclusion criteria for this review.

Data Extraction

Each study was summarized in terms of (a) design, (b) participant characteristics including the family or professional being trained and the individual(s) they were working with, (c) the type of telecommunication system used for video streaming, (d) dependent variables, (e), intervention procedures, (f) study outcomes, and (g) generalization, maintenance, and social validity. The summary of these studies is included in Table 1.

The design was determined based on the description provided by the authors in each included study. Both single subject and group designs were included in this review. The participant characteristics were provided for the individuals receiving the training and included any provided information regarding their gender and the capacity in which they work with or were learning to work with individuals with ASD. Additionally, the age of the individuals with ASD was included when provided. The type of

telecommunication system used included any technological platform used to communicate with trainees.

Dependent variables were included based on the information provided by each study. Both variables relating to trainee outcomes and outcomes related to individuals with ASD were included. Interventions were summarized based on included information.

Participant outcomes were determined by the results provided in each study. Generalization, maintenance, and social validity were also included based on each author's description and were considered positive, negative, or mixed based on the results provided in the study.

Results

Fifteen articles from eleven journals met the criteria for this review. Overall results for included studies are presented below and summarized in Table 1

Table1. *Summary of Included Studies*

Reference	**Design**	**Participants**	**Telecommunication System**	**Dependent Variable**	**Intervention**	**Outcomes**	**G, M, SV**
Alnemary, Wallace, Symin, & Barry (2015)	Multiple baseline with embedded multi-element	4 male special education teachers a 12 year old male with ASD	Skype	Correct implementation of functional analysis	Read Iwata et al. (1982/1994) then received 3 hours training via videoconferencing with descriptions of each condition, videotaped demonstrations, and role play between teachers	Positive across all participants	G+, SV+

Table 1 Cont'd

Machalicek et al. (2010)	Multiple baseline with embedded multi-element	6 female teachers and 2 males and 1 female with ASD aged 5-9	iChat	Correct implementation of functional analysis	Read Iwata et al. (1982/1994) then received feedback in real time while conducting FA	Positive across all participants	M (mixed), SV+
Wainer & Ingersoll (2015)	Multiple Baseline	5 parents and their children with ASD aged 2-4	Password protected video conferencing program	Parent engagement, parent knowledge of RIT, parent fidelity in RIT implementation, and child imitation	Parent self directed training delivered via a secure website followed by remote coaching including answering questions, collaborative problem solving, feedback, and a written feedback form after the session	**Parent engagement, knowledge of RIT, fideility:** Positive **Child Imitation:** Mixed	M (mixed), SV+
Wacker et al (2013)	Alternating treatments	19 mothers and 1 father and their children with ASD aged 2-6	Teleconferencing software	Correct implementation of functional analysis	Parents were provided a 16-page manual on FAs and a one-hour video visit to provide a brief introduction to the	Positive across all participants	

Table 1 Cont'd

					procedures. Followed by live feedback while conducting an FA		
Vismara et al (2009)	Quasi-experimental	10 therapists of varying backgrounds (i.e., SLP, OT, BCBA, etc) and 29 clients aged 2-4	Non specific	Fidelity of implementation of Early Start Denver Model, child social communication behaviors, observation ratings of child engagement	Training of ESDM for 1:1 therapy through the manual plus either telehealth or live training. A second phase included the use of the same strategies for parent training	Positive across all participants and measured variables. No significant difference between live training and telehealth groups	SV+
Subramaniam et al (2016)	Nonconcurrent multiple baseline	4 mothers and their children with ASD aged 2-11	Cisco WebEx Videoconferencing	Global and component parental treatment integrity of discrete trial instruction	In clinic training of DTI, post training in clinic with role play, second in clinic training, followed by videoconferencing with feedback after DTI session	Positive across all participants and measured variables	G+, M+, SV+

Table 1 Cont'd

Pantermuehl & Lechago (2015)	Multiple baseline with embedded muli-element	3 behavior support therapists and one child with ASD	Skype	Correct implementation of error correction procedure	Provided written protocol of error correction procedure then provided in vivo and video based feedback during sessions. Included data on covert sessions where therapists did not know they were being observed	Positive across both Skype and in vivo conditions	
McDuffie et al (2013)	Quasi experimental with a series of A-B replications	4 mothers and their children with ASD aged 2-5	Skype and eCamm Call recording software	Language intervention included follow-in commenting, indirect communication prompts, prompted child communication acts, total child communication acts, and parental	Provided face-to-face parent education lessons with handouts, power points, and videos with discussion, role play, and problem solving with each lesson immediately followed by a clinician	Positive across all DVs with no significant difference between in vivo and teleconference	SV+

Table 1 Cont'd

				verbal responses to child communication acts	coaching session. All followed by 12 weekly coaching sessions via teleconference		
Higgins et al., (2017)	Nonconcurrent, multiple baseline	3 direct care staff members; 3 children with ASD aged 4-5	Adobe Connect with embedded HIPAA-compliant file-transfer system	Correct implementation of MSWO	Self-paced narrated power point with information on how to conduct the MSWO, video feedback with screen shared watching of baseline videos while receiving feedback, role-play with immediate feedback	Positive across all participants	M+, G+, SV+
Machalicek et al (2016)	Multi-element	3 parents and their children with ASD aged 8-16	iChat and eCamm call recording	Correct implementation of functional analysis and intervention, challenging behavior	Handout on FAs and review of procedures prior to each session. Verbal prompting, error correction, and praise via video	Positive across all participants and conditions	SV+

Table 1 Cont'd

					during FA conditions and descriptive praise following each condition. After completion of FAs, a parent education training was conduced with included review of task analysis, video modeling, and practice of intervention with child while receiving live video feedback		
Heitzman-Powell et al (2013)	Pretest-posttest	7 parents and their children with ASD coming from 4 families	Polycom and learning management system	Assessment of parent knowledge in Online and Applied System for Intervention Skills, assessment of	Parents completed OASIS training which included eight modules with online activities and participation in distance	**Assessment of parent knowledge:** Pretest 53.1%, Posttest 92.5% **Application of strategies:** Pretest	SV+

Table 1 Cont'd

				parent skill in applying ABA strategies	coaching sessions. Distance coaching sessions included discussion of tutorial content and real time coaching and feedback	30.6% Posttest 71.8%	
Gibson et al (2010)	ABAB	Two preschool teachers and a 4 year old with ASD	Skype	Child elopement	Face to face meeting, FBA, and intervention procedures developed face to face and then e-mailed to the teacher followed by a skype consultation with role play, feedback, and modeling. FCT was used as the intervention with live streaming which included immediate feedback, verbal praise, and	Positive	SV+

Table 1 Cont'd

					corrective feedback		
Baharav & Reiser (2010)	AB design	Two parents and their children with ASD aged 4 and 5	Skype	Child initiated communication, child responding time to parent, time spent in reciprocal social interactions	One 50-minute session in clinic a week and one 50-minute session in the home completed by the parent with a lesson plan provided by the SLP. In home sessions included remote monitoring with cues and coaching. An internet portal was created as a virtual meeting place for social networking, exchanging information, and contacting clinicians to answer questions	Positive across all participants and measured variables	SV+
Vismara, Young, &	Multiple baseline	9 parents and	Password protected video	Child language imitation,	Parent watched DVD with	Positive across all	M+, SV+

Table 1 Cont'd

Rogers (2012)	their children with ASD aged 1-4	conferencing program	social engagement, and parent fidelity of implementation of interactive behavior	ESDM readings, activities, evaluations, and videos. Parents also received weekly one hour sessions for 12 weeks which included discussion of weekly topic, a coaching via teleconferencing while the parents interact with their child, discussion of next weeks topic, parent feedback on session and examples about training materials, parents practicing new strategy with coaching, joint	participants and measured variables

Table 1 Cont'd

					planning, observation, active listening, and reflective questioning, and identification of natural routines for practice		
Vismara et al (2013)	Multiple baseline	Eight parents and their children with ASD aged 1-3	Password protected video conferencing program and self guided website where therapist saw parent's progress	Parent intervention skills, parent engagement style, parent website usage, child verbal utterances, child nonverbal joint attention	Parents received access to a self-guided website with information on ESDM. Also used a two-way video conference where therapist asked parent about their week, observed the parent playing with their child for 10 minutes, coached parent after session, discussed topic for the next week, had parent	Positive across all participants and measured variables	M+, SV+

Table 1 Cont'd

practice new technique with feedback, and discussed generalization of skill

Note. G = Generalization; G+ = Generalization success for majority of participants; M = Maintenance; M+ = Maintenance success for majority of participants; SV = Social Validity; FA = Functional Analysis; FBA = Functional Behavior Assessment; FCT = Functional Communication Training; RIT = Reciprocal Imitation Training; ESDM = Early Start Denver Model

Design

Of the 15 included studies, twelve used traditional single subject methodology. Eight studies used a form of a multiple baseline design including a traditional multiple baseline (Wainer & Ingersoll, 2015; Vismara, Young, & Rogeres, 2012; Vismara et al., 2013), a nonconcurrent multiple baseline (Subramaniam et al., 2016; Higgins et al., 2017), and a multiple baseline with an embedded multielement design (Alnemary, Wallace, Symin, & Barry, 2015; Machalicek et al., 2010; Pantermuehl & Lechago, 2015). Two studies utilized a multi element or alternating treatments design (Machalicek et al., 2016; Wacker et al., 2013). One study utilized a reversal ABAB design (Gibson et al., 2010) and one study used a time series based AB design where data was collected at the midpoint of the first intervention, which was an in person only training, baseline data was collected prior to the start of the second part of the intervention, and the final data point

was taken at the midpoint of the second intervention component which included a teleconferencing element (Baharav & Reiser, 2010). Remaining studies used quasi-experimental methods (Vismara et al., 2009), a pre-test post-test format (Heitzman-Powell et al., 2013), and a quasi-experimental methods with a series of AB replications (McDuffie et al., 2013). McDuffie and colleagues (2013) stated that the eight participants were broken into two cohorts of parent child dyads with each dyad being paired with another to form a multiple baseline across each dyad (e.g., cohort 1 dyad 1 and cohort 2 dyad 5 were in baseline for 3 days, cohort 1 dyad 2 and cohort 2 dyad 6 were in baseline for 6 days, etc). The days spent in baseline were predetermined, but the interventions received across dyads were identical.

Participants

Data on the characteristics for both the individuals with autism and those being trained to work with them were collected. A total of 89 adults were trained to work in various capacities with a total of 97 individuals with autism. Reported ages of individuals with ASD ranged from 1 to sixteen. Two studies did not report ages of individuals with ASD (Heitzman-Powell et al., 2013; Pantermuehl & Lechago, 2015). Of reported genders, studies included 19 males and five females with ASD (Alnemary et al., 2015; Machalicek et al., 2010; Subramaniam et al., 2016; Machalicek et al., 2016; Gibson et al., 2010; Vismara et al., 2012; Higgins et al., 2017).

Trainees included parents, teachers, and therapists working in the field of special education. Of the 15 included studies, nine focused on parent training (Wainer & Ingersoll, 2015; Wacker et al., 2013; Subramaniam et al., 2016; McDuffie et al., 2013;

Machalicek et al., 2016; Heitzman-Powell et al., 2013; Beharav & Reiser, 2010; Vismara et al., 2012; Vismara et al., 2013). A total of 61 parents were trained. Across studies reporting parental gender, 36 mothers and three fathers participated in trainings (Wacker et al., 2013; Subramaniam et al., 2016; McDuffie et al., 2013; Machalicek et al., 2016; Vismara et al., 2013). Four studies did not report parent gender characteristics (Wainer & Ingersoll, 2015; Beharav & Reiser, 2010; Heitzman-Powell et al., 2013; Vismara et al., 2012). Parental age ranged from 26-43 in reported studies (Wacker et al., 2013; Heitzman-powell et al., 2013; McDuffie et al., 2013; Subramaniam et al., 2016). Additionally, parental education level ranged from high school diploma to advanced graduate degrees in studies where this information was provided (Vismara et al., 2013; Wacker et al., 2013; Wainer & Ingersoll, 2015; Machalicek et al., 2016; Subramaniam et al., 2016).

Three studies provided teacher training (Machalicek et al., 2010; Alnemary et al., 2015; Gibson et al., 2010). A total of twelve teachers were trained across these three studies. Of the twelve, ten were licensed special education teachers and two were teachers' aides. Seven female and four male teachers were reported as participants (Machalicek et al., 2010; Alnemary et al., 2015; Gibson et al., 2010). One study only reported the gender for one participant and not the second, so the exact report on gender is unknown (Gibson et al., 2010). Experience working with individuals with ASD ranged from one to ten years.

Three studies focused on therapist training, with a total of sixteen trained individuals (Vismara et al., 2009; Panthermuehl & Lechago, 2015; Higgins et al., 2017).

Reported education level for therapists ranged from a bachelor's degree to graduate level education including one PhD (Vismara et al., 2009). Six participants reported to be certified in various recognized therapies for individuals with ASD included two speech and language pathologists, two board certified behavior analysts, one occupational therapist, and one psychologist (Vismara et al., 2009). Additional participants had experience working with individuals with ASD as case managers (2), an early childhood program director (1), an early childhood special educator (1), level 1 behavioral support staff (2), and a level 2 behavioral support staff (1), early intensive behavioral intervention behavioral technicians (3) (Vismara et al., 2009; Panthermuehl & Lechago, 2015; Higgins et al., 2017).

Telecommunication System

Skype ™ , a videoconferencing platform that offers free subscriptions, was the most commonly used system for communication between trainers and trainees. Skype ™ was utilized in five studies (Alnemary et al., 2015; Pantermuehl & Lechago et al., 2015; McDuffie et al., 2013; Gibson et al., 2010; Baharav & Reiser, 2010). An additional five studies were not specific in what teleconferencing software they used (Wainer & Ingersoll, 2015; Wacker et al., 2013; Vismara et al., 2009; Vismara et al., 2012; Vismara et al., 2013). Of the studies that did not specify the software utilized, three stipulated that the software was password protected (Wainer & Ingersoll, 2015; Vismara et al., 2012; Vismara et al., 2013) two specifically stating an adherence to the Health Insurance Portability and Accountability Act (HIPAA; Vismara et al. 2013; Higgins et al., 2017). iChat ™, which allows users with Apple ™ software to communicate via videoconference

was used in two studies (Machalicek et al., 2010; Machalicek et al., 2016). Cisco WebEx Videoconferencing was used in one study (Subramaniam et al., 2016), Adobe Connect in another (Higgins et al., 2017), and Polycomm was the platform utilized in one study (Heitzman-Powell et al., 2013).

In addition to videoconferencing systems, two studies reported using eCamm call recording in order to video record the sessions (Machalicek et al., 2016; McDuffie et al., 2013). Three additional studies reported the use of a learning management system or online forum for trainees to receive information that was not directly provided through a face-to-face video system (Wainer & Ingersoll, 2015; Heitzman-Powell et al., 2013; Vismara et al., 2013). For example, Vismara et al. (2013) used a password protected website that featured text and video-based learning modules on each of the 10 Early Start Denver Model (ESDM) intervention topics. This site outlined strategies, provided an introduction and rationale for each topic, had step-by-step instructions, checklist questions, and both good and bad video examples of the steps in use. Additionally, the site had a media sharing page where parents and therapists could share text, audio, and video files, a resource center for autism resources, and a message board that could be utilized by both parents and therapists.

Dependent Variable

Across the 15 studies a total of 28 different dependent variables were measured. Of the 28 variables, 17 were focused on trainee skills, while nine were focused on the skills of the individuals with ASD. Two variables, time spent in reciprocal social interactions and child social engagement, focused on both the trainee and the individual

with ASD (Vismara et al., 2009; Baharav & Reiser, 2010; Vismara et al., 2012). Seven studies assessed multiple variables that related to both trainee and child outcomes (Wainer & Ingersoll, 2015; Vismara et al., 2009; McDuffie et al., 2013; Baharav & Reiser, 2010; Machalicek et al., 2016; Vismara, Young, and Rogers, 2012; Vismara et al., 2013). One study looked only at the outcomes of the individual with ASD (Gibson et al., 2010). Eight studies looked only at variables related to the trainees performance (Alnemary et al., 2015; Machalicek et al., 2010; Wainer & Ingersoll, 2015; Wacker et al., 2013; Subramaniam et al., 2016; Panthermuehl & Lechago, 2015; Hetizman-Powell et al., 2013; Higgins et al., 2017)

Of the variables focused on the outcomes of the individual with ASD, six focused on an aspect of communication including child social communication behaviors (Vismara et al., 2009); prompted and total child communication acts (McDuffie et al., 2013), child initiated communication (Baharav & Reiser, 2010), child communication response time (Baharav & Reiser, 2010), child language imitation (Vismara et al., 2012), and child verbal utterances (Vismara et al., 2013). One variable focused on child nonverbal joint attention (Vismara et al., 2013), and one on spontaneous imitation rate (Wainer & Ingersoll, 2015). Two additional studies looked at the effects on challenging behavior including decreasing challenging behavior by an individualized intervention determined after the trained parents completed a functional analysis (Machalicek et al., 2016) and decreasing elopement behaviors during class time (Gibson et al., 2010).

The most common dependent variable analyzed was the correct implementation of a functional analysis (Alnemary et al., 2015; Machalicek et al., 2010; Wacker et al.,

2013; Machalicek et al., 2016). Of the four studies assessing the effects of their intervention on the correct implementation of a functional analysis two trained parents on the implementation (Wacker et al., 2013; Machalicek et al., 2016) and two trained special education teachers (Alnemary et al., 2015; Machalicek et al., 2010). Five additional variables also looked specifically at the fidelity or integrity of trainees' use of the methodology taught (Wainer & Ingersoll, 2015; Vismara et al., 2009; Pantermuehl & Lechago, 2015; Subramaniam et al., 2016; Vismara et al., 2012), these included fidelity in Reciprocal Imitation Training (RIT; Wainer & Ingersoll, 2015), fidelity in delivery of Early Start Denver Model (ESDM; Vismara et al., 2009), integrity in implementation of discrete trial training (Subramaniam e al., 2016), fidelity in implementation of an error correction procedure (Pantermuehl & Lechago, 2015) and fidelity in the use of 13 different interactive behaviors (Vismara, Young, & Rogeres, 2012). In a similar fashion, three variables assessed trainees' skills or knowledge including knowledge of RIT (Wainer & Ingersol, 2015), parent knowledge of the Online and Applied System for Intervention Skills and parent skill in applying general ABA strategies (Heitzman-Powell et al., 2013), parent intervention skills in applying the ESDM (Vismara et al., 2013). One study similarly assessed participants' fidelity in implementation of the multiple stimulus without replacement preference assessment (Higgins et al., 2017). Additionally, one study monitored parent usage of a website with training materials (Vismara et al., 2013).

Additional trainee based dependent variables included their interaction with the individual with ASD and intervention components. These variables included parent engagement (Wainer & Ingersoll, 2015; Vismara et al., 2013), language intervention

including follow-in commenting, indirect communication prompts, and verbal responses to child communication acts (McDuffie et al., 2023).

Intervention Components

A variety of intervention strategies were used across the 15 included studies. While all studies utilized live streaming telecommunication six studies also included a face-to-face component (Vismara et al., 2009, Subramaniam et al., 2016, Pantermuehl & Lechago, 2015; McDuffie et al., 2013, Gibson et al., 2010; Baharav & Reiser, 2010). The extent of the in vivo training and interaction ranged from one experimental group receiving all training and feedback in person (Vismara et al., 2009) to assessments and intervention development being conducted online, but all feedback being provided via telecommunication (Gibson et al., 2010). Beharav & Reiser (2010) had two components to their intervention. The first being two weekly therapy sessions run by licensed speech therapists in clinic, followed by the second component which still included one weekly in clinic session but replaced the second clinic session with an in home session run by the parents based on a lesson plan provided by the speech therapist with the therapist providing feedback through Skype™ . Other studies alternated between in person and teleconferencing procedures. Panthermuehl & Lechago (2015) provided identical real time feedback to therapists learning an error correction procedure with alternating supervision sessions being provided in person and via Skype™ . Additional strategies completed through in vivo methodology included training with the provision of feedback and role-play (McDuffie et al., 2013; Subramaniam et al., 2016).

The most commonly utilized teleconferencing strategy was delivering real-time feedback including error correction and reinforcement while observing live sessions through video streaming. This strategy was used in 12 studies (Machalicek et al., 2010; Wainer & Ingersoll, 2015; Wacker et al., 2013; Vismara et al., 2009; Pantermuehl & Lechago, 2015; McDuffie et al., 2013; Machalicek et al., 2016; Heitzman-Powell et al., 2013; Gibson et al., 2010; Beharav & Reiser, 2010; Vismara et al., 2012; Vismara et al., 2013). In order to provide live assistance Machalicek and colleagues (2010 & 2016) provided feedback according to an applied behavioral supervision model (O'Reilly et al., 1992). This included the interruption of the functional analysis if an error was made in order to ask the trainee how she might remedy the error. If the correct action was verbalized, the supervisor praised the trainee. If the incorrect action was stated the supervisor described and modeled the correct action. Other interventions utilized the live feedback to provide direction and prompting. Wacker and colleagues (2013) used the feedback in this fashion to give directions to parents in order to increase the fidelity of the implementation of the functional analysis as well as a description as to why they should follow that direction to assist with decreasing the need for these prompts over time. An example of this provided by the author was, "You can ask Johnny to point to a picture. Because Johnny is hitting, you can let him know he does not need to point and you can remove the book" (Wacker et al., 2013).

Video streaming was also used as a training method and to provide post session feedback. This intervention strategy was used in eight studies. (Alnemary et al., 2015; Wainer & Ingersolll, 2015; Subramaniam et al., 2016; Heitzman-Powell et al., 2013;

Gibson et al., 2010; Vismara et al., 2012; Vismara et al., 2013, Higgins et al., 2017). For example, Alnemary and colleagues (2015) provided a 3-hour training to special education teachers in Jeddah, Saudi Arabia that included the topic of functional behavior assessment with an emphasis on functional analysis. The training included descriptions and reasons for each condition in the functional analysis, video taped demonstrations, instructions to role-play with other participants, and the answering of questions. Following the evaluation participants simulated implementing functional analysis conditions and then received individualized feedback via video streaming in order to assist with and correct errors that occurred during the simulation.

Studies also used video streaming to provide feedback to trainees after observing their interactions with the individual with ASD. This feedback included using adult learning styles such as joint planning, observation, active listening, reflective questioning, discussion of content, and planning for generalization opportunities or how to implement an intervention different in the future (Wainer & Ingersoll, 2015; Subramaniam et al., 2016; Heitzman-Powell et al., 2013; Vismara et al., 2012; Vismara et al., 2013). The timing of the feedback varied across sessions as some occurred at the end of an entire interaction period between the trainee and an individual with autism, and others occurred after observing a 10-minute interaction.

An additional intervention methodology included providing trainees with written plans, information, or materials. These materials included an individualized lesson plan or intervention protocol (Baharav & Reiser, 2010; Gibson et al., 2010; Pantermuehl & Lechago, 2015), information provided through lessons, modules with power points,

examples, videos, checklists, quizzes, and written instructions and information (Wainer & Ingersoll, 2015; McDuffie et al., 2013; Heitzman-Powell et al., 2013; Vismara et al., 2012; Vismara et al., 2013; Higgins et al., 2017), a developed manual (Wacker et al., 2013; Vismara et al., 2009), full research articles or handouts summarizing published research articles (Alnemary et al., 2015; Machalicek et al., 2010; Machalicek et al., 2016). Wainer and Ingersoll (2015) also utilized written technology by summarizing post conference feedback to their trainees in written form and providing it to them for their reference. All written material used as training material was provided prior to additional training or interventions and was used as an initial learning tool. For example, multiple studies had their participants read Iwata et al. (1982/1994) as an introduction to functional analysis prior to learning how to implement the assessment themselves (Alnemary et al., 2015; Machalicek et al., 2010).

In addition to the above-mentioned components Pantermuehl and Lechago (2015) also used video technology to covertly observe their participants. Two months prior to training a camcorder was positioned on a bookshelf in the front of the clinical setting where sessions between the trainee and the individual with ASD took place and the recording indicator light was disabled so trainees would not know when it was activated. The camcorder was turned on and off in the absence of the therapists and the experimenters recorded trainees performing an error correction procedure and collected data which was then compared to sessions where in vivo or video streaming supervision occurred.

Outcomes

All 15 studies reported positive outcomes across all participants and measured variables for the use of telecommunication to train parents, educators, and professionals to provide assessment or intervention to individuals with ASD. Additionally, of the eight studies assessing outcomes of individuals with ASD, seven reported positive results across all variables and participants (Vismara et al., 2009; McDuffie et al., 2013; Gibson et al., 2010; Baharav & Reiser, 2010; Machalicek et al., 2016; Vismara, Young, and Rogers, 2012; Vismara et al., 2013) with one study reporting mixed results (Wainer & Ingersoll, 2015). Four of the five participants in Wainer and Ingersoll (2015) displayed increased levels of spontaneous imitation. One participant showed low but variable data throughout baseline and intervention.

The eight studies assessing the trainees' performance, including fidelity and integrity of intervention implementation, all reported positive results across participants and variables (Alnemary et al., 2015; Machalicek et al., 2010; Wainer & Ingersoll, 2015; Wacker et al., 2013; Subramaniam et al., 2016; Panthermuehl & Lechago, 2015; Hetizman-Powell et al., 2013; Higgins et al., 2017).

Two studies looked at a comparison between acquisitions of intervention components when supervision was provided in person versus via live video streaming (Vismara et al., 2009; Panthermuehl & Lechago, 2015). Vismara and colleagues (2009) provided 10 therapists of varying backgrounds the training manual for the ESDM. Five therapists received continued training and supervision in person, while the others received continued training and supervision via video streaming. The determination

between in person or video streaming was based on their distance from the university and was not randomized. Panthermuehl and Lechago (2015) provided level 1 and 2 behavioral support therapists supervision on an error correction procedure, randomly alternating between in person and live viedo streaming to provide feedback and reinforcement. Both studies found no significant difference between supervision delivery models.

Three studies utilized in person and teleconference training for different components of their study (Subramaniam et al., 2016, Baharav & Reiser, 2010, McDuffie et al., 2013). For example, McDuffie and colleagues (2013) provided initial training on a language intervention through face-to-face education lessons, and face-to-face clinical coaching with feedback following each lesson. After the completion of all in person training, parents received weekly coaching sessions via teleconference. All three studies utilizing this or similar methodology found positive results across all participants and variables, and found no significant difference between in person and video streaming phases as results maintained with video streaming, with the exception of Baharav and Reiser (2010) who found increased positive outcomes during the video streaming phase for one participant.

Generalization, Maintenance, and Social Validity

Generalization was measured in three studies (Alnemary et al., 2015; Subramaniam et al., 2016; Higgins et al., 2017). All three studies used adult actors for the trainees to learn the intervention or assessment with. Once trainees reached mastery

criteria they generalized their skills to a student or their child. Generalization was successful across all studies.

Maintenance was assessed in six studies (Machalicek et al., 2010; Wainer & Ingersoll, 2015; Subramaniam et al., 2016; Vismara et al., 2012; Vismara et al., 2013; Higgins et al., 2017). All participants included in the maintenance data continued to successfully implement strategies of the ESDM, discrete trial instructions, and MSWO. Child outcomes remained successful as well (Subramaniam et al., 2016; Vismara et al., 2012; Vismara et al., 2013).

Two studies assessing maintenance received mixed results (Machalicek et al., 2010; Wainer & Ingersoll, 2015). Four of five parents maintained high levels of fidelity when implementing reciprocal imitation training in Wainer and Ingersoll (2015). Machalicek and colleagues (2010) found that the majority of participants maintained their delivery of functional analysis for four weeks or more, with various declines in implementation occurring across different conditions while maintaining in others.

Thirteen studies measured social validity through the use of questionnaires or information gathering on material including the likability, feasibility, and effectiveness of the intervention as well as the use of technology (Alnemary et al., 2015; Machalicek et al., 2010; Wainer & Ingersoll, 2015; Vismara et al., 2009; Subramaniam et al., 2016; McDuffie et al., 2013; Machalicek et al., 2016; Heitzman-Powell et al., 2013; Gibson et al., 2010; Baharav & Reiser, 2010; Vismara et al., 2012; Vismara et al., 2013; Higgins et al., 2017). The results of the social validity measures were positive across all measured studies.

Discussion

All 15 studies found positive results for the use of telecommunication to train individuals to work with those with ASD. This provides promising results for the use of telepractice as a training and supervision tool. Additionally, seven of the eight studies measuring child outcomes found positive results, which also provides support for the use of telecommunication, as it displays promise for its effectiveness in improving outcomes for individuals with ASD when a person trained through this method is providing the intervention (Vismara et al., 2009; McDuffie et al., 2013; Gibson et al., 2010; Baharav & Reiser, 2010; Machalicek et al., 2016; Vismara et al., 2012; Vismara et al., 2013). The two studies comparing acquisitions of intervention components when supervision was provided in person versus via live video streaming showed no difference in results between the two (Vismara et al., 2009; Panthermuehl & Lechago, 2015). This information is extremely valuable as it begins to show an increasing promise for the use of telecommunication. If training is as efficient through telecommunication as it is in person, the field may have more push to provide services via that format when applicable without concern for decreased efficiency.

Additionally, positive results were found regardless of whom was trained. Participants included parents, teachers, and therapists with education levels ranging from high school diploma to advanced degrees. While the literature shows a gap in service delivery to individuals with ASD whose parents have lower education levels, the current review shows a promise in training these parents to work with their children (Nguyen, Krakowiak, Hansen, Hertz-Picciotto, & Angkistsiri, 2016; Thomas, Ellis, McLaurin,

Daniels, & Morrissey, 2007). The positive effects of this training may be able to assist in decreasing the gap, as parents can be taught to provide their children with effective intervention with the support of trained staff via video conferencing. This result is also promising for general education teachers as increased training in working with children with special needs is necessary for this field (Hayes, Casey, Williamson, Black, & Winsor, 2013; Scheuermann, Webber, Boutot, Goodwin, 2003). Finally, the training of therapists using the ESDM shows hope for collaboration between practices in learning methods utilized by other fields and providing evidence based practices (Vismara et al., 2009). The increasing need for services for individuals with ASD often leaves providers with extremely demanding schedules. While professionals typically take continuing education courses within their field, teaming and learning the practices of others to ensure a continuum of services does not often occur. The use of telepractice though opens up the possibility for the learning of various evidence-based models in a more limited time frame (i.e., no driving, commuting, etc).

The positive social validity results from 13 studies also shows promise for the use of video streaming in the field (Alnemary et al., 2015; Machalicek et al., 2010; Wainer & Ingersoll, 2015; Vismara et al., 2009; Subramaniam et al., 2016; McDuffie et al., 2013; Machalicek et al., 2016; Heitzman-Powell et al., 2013; Gibson et al., 2010; Baharav & Reiser, 2010; Vismara et al., 2012; Vismara et al., 2013; Higgins et al., 2017). This assists in the growing evidence for the use of this practice as it adds a measure of likability and usability to the intervention strategies. Past technology has created challenges for using telepractice systems. For example, Rule, Salzberg, Higbee, Menove,

and Smith (2006) were not able to provide services via telecommunication as the Polycom system they used created bandwidth issues that were not resolved. The high social validity of the studies included in this review however suggests that the technological barriers seen in the past are a dissipating concern.

A challenge to the above positive results though is the limited data collected on measures of generalization. Studies measuring generalization only generalized from providing assessments and interventions to actors to providing the same treatments to individuals with ASD (Alnemary et al., 2015; Subramaniam et al., 2016; Higgins et al., 2017). While these results are an important component in showing the effectiveness of the interventions, it would be beneficial to find if the results generalize to working with other individuals with ASD. This is especially important when considering the training of general education teachers and therapists. Individuals in those roles tend to work with a variety of children or adults with ASD. For the training to be truly successful the trainee would need to be able to carry over what they have learned to (a) know when to use it on another individual and (b) to use the assessment or intervention components successfully.

It is also imperative that the field begins to look at the technology being utilized when providing tele-based practices. It is important to implement privacy, access, and security safeguards when working with individuals as a component of best practice, yet platforms such as Skype ™ and iChat ™ are not HIPAA approved technologies (Nathan, R., Nitesh, C., 2013). Only two study specifically cited the use of a HIPAA compliant video streaming source (Vismara et al., 2013; Higgins et al., 2017). While other studies

stated that the platform utilized was password protected, this does not necessarily ensure that the encryption of the data is appropriate for protection of client information (Wainer & Ingersoll, 2015, Vismara et al., 2012). In order for the field to progress in this domain it is necessary that all take every precaution to safeguard those we are working with.

While this review displays a promise for training and supervising individuals working with children and adults with ASD, the results must be taken with caution. One limitation is the small number of studies included in this review. With the use of telepractice seemingly on the rise there may be more information to determine the effectiveness of this practice in the future. However, the current literature lacks enough information to fully determine the effects of this practice. Additionally, with the focus of this review on the training and supervision of others, important information on the use of video streaming, such as its use in assessing or directly treating individuals with ASD is missing. With telecommunication being a newer component to the field, this information may have assisted in adding to the results in determining effectiveness.

Future research needs to be completed in order to truly assess the effectiveness of telecommunication as a training tool. One area future research needs to focus on is the training of individuals who are working towards various certifications in the field. While research has found some effectiveness for those currently working with individuals with ASD, it is important to assess whether or not those in the very early stages of this field can be trained this way. Additionally, future research should examine the use of video streaming through HIPAA compliant technology to ensure that new challenges do not arise when using these platforms. Finally, the studies reviewed focused mainly on

training very specific assessment platforms or on entire intervention programs. Looking at training of additional variables would assist in determining the effectiveness of training through telecommunication systems.

CHAPTER 3: METHODOLOGY

The purpose of this chapter is to introduce the methods used in this study. This chapter is broken down into seven sections. The first section includes participant information. Next, details regarding the setting and materials used are provided. The third section delivers information on the setting design. Fourth, the target participant behaviors and measurement system for collecting information on these behaviors is specified. The fifth section provides information on the data collection system including inter-observer agreement and fidelity measures. Sixth delivers a detailed description of the experimental procedures. Lastly, a description of the methods used to collect social validity information is provided.

Participants

Six students seeking masters' degrees in the field of special education participated in the study. Participants were recruited from the University of Texas master degree cohorts in autism and developmental disabilities and early childhood special education. All participants are currently receiving supervised hours towards obtaining their BCBA with supervisors outside of this research study. Five of the participants were female and one participant was male. Five participants had completed a bachelors' degree in education, human development, or a related field. One participant completed his bachelor's degree in English. The average age of the participants was 24.8 with a range from 23-30. The average number of years working with individuals with disabilities was 4 years with a range from 3-5 years. Table 2 lists individual participant characteristics including age and gender, ethnicity, educational background, and years working with

individuals with disabilities. All individuals reported little to no previous background with preference assessments. Four individuals reported having some coursework that discussed preference assessments, but no direct clinical work (i.e., Kerry, Simon, Jessica, Hailey).

Simulated Client

The simulated client was an individual who performed the role of a client participating in a preference assessment. A graduate student in the field of special education played the role of the simulated client for all participants across conditions. This individual has approximately 5 years experience providing preference assessments. It is important to note that the simulated client only performed this role, and did not provide feedback or participate in providing training to the participants in anyway.

Generalization Participants

Four of the children with ASD or developmental disabilities were recruited through the master students' practicum placement sites and had previous experience working with the student participant. All participants and their parents signed consent to participate in the study. Two participants were unable to use clientele at their practicum placement sites for participation in the study. These participants (i.e., Alyssa and Kerry) worked with individuals who were recruited through local agencies and whose parents signed consent to have them participate in the study. Alyssa and Kerry did not work with these individuals outside of this research study. Five males and one female participated as generalization clients. The average age for the generalization participants was 9.8 with a range from 4-30. Four of the clients had a diagnosis of ASD. One client had a co-

diagnosis of ASD and Turner's Syndrome. One client had a diagnosis of Social Communication Disorder. Table 3 lists the individual characteristics of the generalization clients including their age, gender, and diagnosis.

Table 2. *Participant Information*

Name	**Age and Gender**	**Identified Ethnicity**	**Highest Degree Obtained**	**Experience**
Alyssa	23; Female	Caucasian	Bachelor of Science in Family and Consumer Sciences	5
Hailey	24; Female	Caucasian	Bachelor of Humanities and Elementary Education	4
Jessica	23; Female	Caucasian	Bachelor of Science in Applied Learning and Development	3
Kerry	25; Female	Caucasian	Bachelor of Arts in Early Childhood Elementary and Special Education	4
Simon	30; Male	Latino	Bachelor of Arts in English	5
Stacey	22; Female	Caucasian	Bachelor of Arts in Speech-Language Pathology/Audiology	3

Table 3. *Generalization Participant Information*

Participant Name	**Generalization Client Name**	**Generalization Client Age and Gender**	**Generalization Client Diagnosis**	**Materials**
Alyssa	Jacob*	7; Male	Social Communication Disorder	DS, Legos, figurine, box of toys, snack bag

Table 3 cont'd

Hailey	Sarah	6; Female	Turner Syndrome and Autism	Stuffed elephant, necklace, dinosaur, lei, ball
Jessica	Peter	6; Male	Autism Spectrum Disorder	Large bug, squish ball, ball, slinky, string toy
Kerry	Ethan*	4; Male	Autism Spectrum Disorder	Play dough, marker, stickers, book, puzzle
Simon	Steven	6; Male	Autism Spectrum Disorder	Look and find, puzzle, play dough, mirror, squish toy
Stacey	Andrew	30; Male	Autism	iPad, sports book, music, squish toy, puzzle

*Denotes clients that were not a part of participants typical caseload

Setting and Materials

Sessions with the simulated client were conducted in a quiet room on the University of Texas campus. The room had a table and chairs. The materials utilized with the simulated client (i.e., various balls, a puppet, a toy duck, a finger toy, and play dough) were brought into the room only when sessions were being conducted. Other materials in the room included a computer for live streaming and video conferencing purposes, pen, and paper. Participants were allowed to bring in additional materials they felt would assist them in performing the preference assessments (i.e., stopwatch and calculator).

The BCBA providing feedback to each participant was located in a locked office on the University of Texas campus. The office had two desks, one facing the door and one facing the wall. All sessions were conducted from the desk facing the wall. There were no computers in the office, so a computer was brought in to the office for research purposes.

For videoconferenced feedback the BCBA providing feedback was located in the same locked office described above. The participant was located in a setting of their choice (i.e., a quiet room on the University of Texas campus, home).

Generalization and maintenance probes were conducted at the practicum work site for four of the six participants. This included in a school setting for two of the participants, and in a home setting for one and a clinic for one participant. The remaining two participants did not have clients available to them at their work site and instead used consenting clients in the community who chose to participate in the research. Both of

these clients' generalization and maintenance sessions were conducted in the homes. For generalization clients, participants had a handheld video camera in order to record the sessions, their own stopwatch, calculator, paper, and pencil. Additional materials included the materials utilized in the preference assessments for each client. These materials were determined based on parent and staff interview. All participants utilized tangible materials with the exception of one participant whose choices included a snack bag that held a variety of options for him to eat. Table 3 reports materials used for each individuals' preference assessments.

Teleconferencing Equipment

For teleconferencing purposes, two laptop computers were used (i.e., 2.0Ghz MacBook Air ™ laptop computer). All computers had access to built in microphones, speakers, and webcams (e.g., built in iSight ™ camera and internal microphone and speaker). One laptop with webcam, microphone, and speaker was located in the room where sessions with the simulated client occurred. The other was located with the supervising BCBA. Computers were connected to the Internet via wireless connection. The Internet service was provided by The University of Texas at Austin.

All Teleconferencing was conducted through the use of VSee HIPAA Messenger. VSee HIPAA Messenger provides secure video conferencing, screen sharing, screen recording, and text messaging. All communication was HIPAA compliant. The services used a 256-bit AES encryption. There was no minimum requirement for Internet speed. The participants and BCBA providing feedback connected to VSee through a

secure login. Data was then transmitted via a wireless local area network (LAN) maintained by the university.

Design

A multiple baseline with an embedded multielement design was implemented in an attempt to demonstrate experimental control within each participant's data set (Kennedy, 2005). Participants conducted the multiple stimulus without replacement (MSWO) and the paired stimulus (PS) preference assessments across all phases. Participants were separated into two randomized groupings. The groupings were utilized to determine which feedback form an individual received for each preference assessment type, and had no additional influence on any data collection, performance, or results of the study, as each grouping functioned as its own control for the study.

During baseline the same procedures were used among all participants and assessments. For phase two of the study, group one received feedback via live streaming videoconferencing while performing the MSWO and post assessment feedback via video conferencing with a shared screen recording of the PS preference assessment. Group two received feedback via live streaming videoconference for the PS assessment and post assessment feedback via video conferencing with a shared screen recording of the MSWO assessment. A full description of the procedures for each grouping is provided below. All procedures were the same across participants and assessments.

Measurement and Target Behaviors

Participants were trained in the delivery of the MSWO and PS assessments. In order to evaluate the effectiveness of the feedback and training models, data was

collected on the participants' implementation of the assessment. Each condition contained anticipated participant responses, which result in the appropriate delivery of that assessment model. These anticipated responses were adapted from Roscoe et al., 2006 and Roscoe & Fischer, 2008 (Table 4). Each response opportunity was broken down into a task analysis with antecedent and consequent behaviors for each preference assessment. Antecedent responses were marked correct if they occurred and occurred appropriately. For example if in the MSWO condition the participant presented each item to the child for 30 seconds (+/- 3 seconds) that was counted as correct, if the presentation did not occur, or occurred for less than or greater than 30 seconds (+/- 3 seconds) it was marked as incorrect. Consequence responses were marked correct if the appropriate response occurred and occurred correctly. For example, for the PS assessment, after instructing the child to "pick one" removing both items and reinitiating the same trial was only marked correct if the client selected both items simultaneously or in close succession with each other. If the participant did not remove both items and reinstate the same trial after the client picked both items, this was scored as incorrect. If any other action occurred and the participant removed both items and initiated the same trial again, this was marked as incorrect. Criterion for mastery was set at 100% accuracy across two trials for each assessment type.

Scripts Used for Simulated Client

The simulated client used one of three scripts for each session while the participants conducted the preference assessment. Each preference assessment type (i.e., PS and MSWO) had three scripts, which specified the simulated clients actions for 14 assessment

trials including 11 distractor trials and three standard trials for the MSWO and 15 assessment trials including 11 distractor trials and four standard trials for the PS (Appendix A). The fifteenth trial was added for the PS in order to allow the student the ability to complete the assessment. Data was only collected however on the first 14 trials. Standard trials included appropriate responding including selecting one item within the first five seconds of presentation (+/- 1 second) in the PS and selecting one item within the first 30 seconds of presentation in the MSWO. Distractor trials included inappropriate responding. For the PS this was comprised of selecting both items simultaneously (four trials); not selecting an item within five seconds (four trials); and reaching for and attempting to select an item that was not one of the presented items (three trials). For the MSWO distractor trials were comprised of selecting two stimuli simultaneously (three trials); selecting one stimuli and then quickly reaching for and attempting to select a second choice (three trials); reaching for and attempting to select an item that was not one of the presented items (three trials); and not selecting an item within 30 seconds (two trials). Participants were exposed to all three scripts for each condition (six scripts in total), and the presentations of these scripts were randomized.

Table 4 *Task Analyses of Expected Participant Behaviors During Delivery of Preference Assessments*

Multiple Stimulus Without Replacement
1. Participant presents each item to the client for 30 seconds (+/- 3 seconds)
2. Participant presents all items in a straight line in front of the client and instructs the client to "pick one"
3. After client selects an item participant removes/blocks access to all other items
4. (a). if the client selects an item within 30 seconds (+/- 3 seconds) the participant provides access to that item for 30 seconds (+/- 3 seconds)

Table 4 Cont'd

(b) if the client selects two items in close sequence the participant gives the client access to the first item selected for 30 seconds (+/- 3 seconds)

(c) if the client selects two items simultaneously, the participant blocks access to both items and reinitiates the same trial

(d) if the client again selects two items simultaneously the participant removes all items and initiates a new trial

(e) if the client does not select an item within 30 seconds (+/- 3 seconds) the participant removes all items and initiates a new trial

(f) if the client grabs another item while having access to the selected item the participant blocks access to the item and continues with the current trial

5. After 30 seconds (+/- 3 seconds) the participant removes the selected item

(a)does not put it back into the array

(b) rotates the remaining items by shifting each item one to the left

6. The participant accurately records the client selections on each trial

7. The participant accurately summarizes the client data, including obtaining a selection percentage and corresponding rank for each item

Paired Stimulus

1. Participant presents each item to the client for 5 seconds (+/-1 second)

2. Participant places two items in front of the client and instructs the client to "pick one"

3. (a) if the client selects an item within 5 seconds (+/-1 second) the participant immediately removes the unselected item and provides access to the selected item for 5 seconds (+/-1 second)

(b) if the client does not select an item within 5 seconds (+/-1 second) the participant

(i) removes both items

(ii) allows the client to re-sample each item for approximately 5 seconds(+/-1 second),

(iii) represents the same trial

(iv) If the client again does not respond, the participant removes both items and initiates the next trial

(c) if the client selects both items simultaneously or in close sequence with each other the participant removes both items and reinitiates the same trial

(i) if the client does not select an item within 5 seconds (+/-1 second) or selects both items a second time, the participant removes both items and initiates the next trial

Table 4 cont'd

(d) if the client grabs an item that was not presented, the participant blocks access to or removes the item and continues with the current trial

4. After 5 seconds (+/-1 second) the participant removes the item

5. Participant correctly records the client selection for each trial

6. The participant accurately summarizes the client data including obtaining a selection percentage and corresponding rank for each item

Data Collection

The steps of each preference assessment were broken down into component tasks using a task analysis procedure, which was utilized as a data collection method (Appendix B). Correct responses were defined as independent completion of a single step of the analysis. Incorrect responses were defined as failing to complete a necessary step or incorrectly implementing a step. Nonessential steps for each trial were counted as so and were not marked correct or incorrect. The total number of correct steps was divided by the total number of expected steps (i.e., correct + incorrect steps) and multiplied by 100 for each full task analysis in order to obtain a percentage of appropriate responding. All data was entered into a line graph for visual analysis.

Inter-Observer Agreement (IOA)

The author, a doctoral student in special education and a board certified behavior analyst, provided the training and supervision for each participant. All sessions were recorded through Vsee's screen recording option. A second observer, a graduate student in special education, independently scored data on target steps for 33% of all sessions across all phases of the study. Data from the two observers were compared for

agreements and disagreements. Agreement was considered if both observers scored a correct or incorrect response for a step of the task analysis. Any inconsistency between the observers for any step of the task analysis was scored as a disagreement. Total agreement was determined by dividing the number of agreements by the total number of steps (i.e., agreements + disagreements) for each assessment and multiplying by 100 to get a percentage of agreement. For Stacey, Jessica, and Hailey average agreement was 96.5% with a range of 93-100%, 88-100%, 94-100% for each participant respectively. Agreement for Kerry was 95% (range 88-100%). For Simon and Alyssa, agreement was at 97% with a range of 90-100 and 93-100% for each participant respectively. Mean agreement across participants was 96% (range 88 to 100%).

Procedural Fidelity

The author's implementation of the supervision model was also recorded using Vsee's screen recording option. An independent observer, a graduate student in special education, assessed treatment fidelity for the intervention phase. The observer scored a task analysis (Appendix B) of the anticipated supervisor responses for a randomly selected 33% of videotaped intervention sessions. Correct responses were defined as independent completion of a single step of the analysis. Incorrect responses were defined as a missed response or incorrect implementation of a response. In order to obtain a percentage of appropriate supervisor responses, the number of correct responses was divided by the total number of anticipated supervisor responses (i.e., incorrect + correct responses) and multiplied by 100. The mean supervision fidelity score across all participants was 93% with a session range from 80 to 100%.

Fidelity was also taken on the actor's adherence to the script. A separate graduate student in special education took fidelity data on 33% of randomized videotaped sessions. Correct responses were defined as independent adherence to actions provided in the script (Appendix B). Incorrect responses were defined as a missed response, or an incorrect action (i.e., not what the script said to do). In order to obtain a percentage of appropriate actor responses, the number of correct responses was divided by the total number or expected responses and multiplied by 100. The mean actor fidelity score across participants and conditions was 98% with an individual session range of 86 to 100%.

Procedures

Baseline

Approximately thirty minutes prior to the first session all participants received in person a written summary of the PS and the MSWO assessments based on the implementation described in peer-reviewed articles (Fisher et al., 1992; DeLeon & Iwata, 1996; Appendix A). Participants were asked to read both summaries prior to conducting any preference assessments and to return the summary to the researcher as soon as they felt they understood the material enough to perform the assessments. Participants had no further access to this written information.

During all baseline sessions, participants were instructed to log in to Vsee via the computer placed in the room. They then were expected to complete either the PS or MSWO using the same materials with the simulated client. The supervisor prompted via telecommunication when to start each assessment. There were no further instructions or

feedback provided. Blank data sheets and pens were provided to the participants (Appendix A).

For both baseline and intervention the simulated client had the scripts on a chair under the table away from the view of the participants. The simulated client had previously been told which script to use so no discussion of the scripts occurred in front of the participants.

Intervention

Participants were randomly split into two groupings. Each participant performed the MSWO and the PS assessment on randomized and counterbalanced sessions. Feedback was provided to all participants in all conditions following an applied behavioral supervision model consisting of error identification, error correction, and praise (O'Reilly et al., 1992). Participants were instructed to log in to Vsee via the computer placed in the room. The supervisor prompted via telecommunication when to start each assessment. Further feedback was provided based on grouping in the following manner.

Grouping 1. Grouping 1 received live feedback and reinforcement while conducting the MSWO preference assessment via live streaming videoconference, and received feedback and reinforcement via videoconferencing while watching a prerecording of their performance of the PS preference assessment via Vsee screen sharing.

For live feedback, corrective feedback occurred when a step in a trial was done incorrectly and included (1) an acknowledgement from the supervisor that an error

occurred (e.g., "wait to continue, is everything correct?"), (2a) if the participant corrected the error on their own, with only the acknowledgement that an error occurred the supervisor provided verbal reinforcement. (2b) if the participant was not aware that there was an error, was unsure of what the error was, or continued to perform incorrectly the supervisor provided the information necessary to complete the step correctly (e.g., you need to rearrange the items before presenting the next trial). The supervisor then provided verbal reinforcement when the step was correctly implemented. (3) Verbal reinforcement in the form of praise was provided at the end of each assessment for procedures implemented correctly. At the end of the session the supervisor also summarized for the participant what they needed to do differently to perform at mastery.

Feedback was provided via co-watching a recording of themselves delivering the PS assessment via screen share. The assessment was conducted within 24 hours of the screen share videoconference. The recording was completed through VSee video recording during their session with the simulated client. During the scheduled videoconference time the Vsee recording was pulled up as a screen share and was viewed by both the participant and the supervisor. During the videoconference the supervisor paused the video when an error occurred and provide feedback by (1) acknowledging that there was an error (e.g., "did you notice something wrong in the step we just watched?") (2a) if the participant recognized the error on their own the supervisor instructed them to state the correct step (e.g., (s) what should you have done differently?) if the participant responded correctly (e.g., (p) I should have taken the toy away after 5 seconds) the supervisor provided verbal reinforcement and continued with the video (2b) if the

participant responded incorrectly or was unsure of how to respond the supervisor stated the correct step for them and allowed them the opportunity for clarification (e.g., you needed to take away the toy after 5 seconds. Do you see where the error was with that?). (3) Verbal reinforcement in the form of praise was provided for steps implemented correctly at the completion of the assessment. At the end of the session the supervisor also summarized what needed to be done for the participant to perform to mastery.

Grouping 2. Grouping 2 received live feedback and reinforcement while conducting the PS preference assessment via live streaming videoconferencing, and received feedback and reinforcement via videoconferencing using a pre-recorded performance of themselves delivering the MSWO assessment.

For live feedback, corrective feedback occurred when a step in a trial was done incorrectly and included (1) an acknowledgement from the supervisor that there was an error (e.g., was that the correct step?). (2a) if the participant corrected the error on their own reinforcement was provided in the form of verbal praise. (2b) If the participant was unsure what the error was, stated the error incorrectly, or continued to perform the step incorrectly the supervisor provided the information for the correct step (e.g., you need to initiate the next trial). Verbal reinforcement was then provided when the step was completed correctly. (3) The supervisor provided reinforcement in the form of verbal praise at the completion of the assessment for steps implemented correctly. At the end of the session the supervisor also summarized what the participant needed to do next time to improve their performance.

Grouping 2 received feedback and reinforcement via post assessment videoconferencing with screen sharing for the MSWO. The video was recorded via Vsee screen share during their session with the simulated client. Within 24 hours of the assessment occurring the participant and the supervisor video conferenced while co-watching the recording of the participant delivering the MSWO assessment. Feedback was provided to the participant by the supervisor in the form of pausing the video when an error occurred and providing feedback in the following manner (1) acknowledging there was an error (e.g., did anything look wrong to you in what we just watched?) (2a) If the participant recognized the error on their own the supervisor instructed them to state what the correct step was (e.g., (s) what should you have done differently?) If the participant responds correctly the supervisor provided verbal praise and continued with the video (2b) if the participant did not recognize the error or responded incorrectly the supervisor stated the correct step for them and allowed the opportunity for clarification (e.g., you needed to provide the child with the item for 30 seconds. Do you see where the error was?) (3) Reinforcement in the form of verbal praise was provided to the participant at the completion of the video for steps implemented correctly. At the end of the session the supervisor also summarized what steps were necessary in order to reach mastery.

Generalization

Generalization probes were conducted across all participants and phases of the study. Generalization was conducted on individuals with developmental disabilities. Four of the participants performed the MSWO and the PS on individuals with whom they regularly worked. Two of the participants performed the MSWO and the PS on

individuals in the community who consented to participate in research. They had no prior exposure to these individuals. All participants were told to perform a brief interview with the parents in order to determine appropriate materials for the preference assessments. No other directions were provided during any phases. All generalization probes mimicked the baseline phase, in that no feedback was provided. All participants video recorded their generalization sessions and data was collected in the same manner as all other phases of the study, based on the task analysis (Table 4).

Maintenance

Maintenance data was collected at approximately four and six weeks after the completion of the intervention for four of the six participants and at six weeks post intervention for one participant. Stacey was unable to see her generalization client at the four-week maintenance check and therefore only was able to perform the preference assessments at six weeks. Jessica no longer had access to her client at the time of the maintenance checks and was unable to obtain consent for any new clients. All other participants were able to complete both assessments at four and six weeks post intervention.

Maintenance data was only collected on the generalization clients. Procedures for maintenance were identical to baseline and generalization in that the supervisor did not provide any corrective feedback or reinforcement. Data collection was completed in the same manner as all other generalization phases of the study.

Social Validity Questionnaire

Following the last intervention session, participants were asked to complete a social validity questionnaire (Appendix C). The questionnaire contained 20 questions and was used to assess the perceptions of the participants' use of live feedback via teleconferencing (3 questions), the use of videoconferencing and screen sharing (3 questions), the error correction procedure (3 questions), the use of distance supervision as a whole (2 questions) and the outcome of the training (2 questions). A 5-point Likert scale was utilized to assess the responses. Responses ranged from one being very dissatisfied to five being very satisfied. The additional seven questions were open-ended and were asked in order to gather information on the perceptions of the participants that were not captured by the Likert scale. One open-ended question also provided participants space to write any additional information that was not asked in previous questions. The social validity questionnaire was sent through SoGoSurvey™.

CHAPTER 4: RESULTS

This chapter presents the study results in various sections. The first section presents baseline and intervention results and discusses the effects of participant implementation of the MSWO and PS preference assessments in regards to receiving feedback delivered live via teleconferencing and feedback delivered via videoconferencing and co-watching of a previously recorded video. The second section reports results for generalization and maintenance sessions where implementation was conducted without supervisor feedback. The final section provides information regarding participants' perception of participation in the research through the results of the social validity questionnaire.

Performance on Preference Assessments with Simulated Client

Figures 1 and 2 display participant performance on the MSWO and PS assessments during baseline, intervention, generalization, and maintenance phases. Figure 1 shows participants in grouping 1 (Stacey, Jessica, and Kerry), whom received live feedback while conducting the MSWO and video conferenced feedback during the PS for the intervention phase. The results for grouping 2 (Hailey, Simon, and Alyssa) are shown in Figure 2. Grouping two received live feedback while conducting the PS and video conferenced feedback while implementing the MSWO during the intervention phase. All participants showed stable responding during baseline. Additionally, all participants reached a mastery criterion of two sessions with 100% accuracy within five sessions for each preference assessment type.

During baseline grouping one had moderate to high correct responding across both preference assessment types. Across all participants in grouping 1, appropriate responding for the paired stimulus was higher in baseline than for the multiple stimulus without replacement. Jessica had the highest baseline scores with a median of 65.3% correct responding in the PS condition (range = 61-71%) and a median of 58.2% correct responding in the MSWO condition (range = 54-65). Kerry's median in baseline for the PS condition was 48.2% (range = 34-56%), and 47.5% in the MSWO condition (range= 40-52%). Stacey's baseline median was 49.7% for her performance on the PS (range = 47-54) and 39.3% on the MSWO (range 38-44%).

All participants immediately increased their appropriate responding in the MSWO condition, with the first data point being an increase in 23, 33, and 42 percentage points for Jessica, Kerry, and Stacey respectively from their highest baseline point. With each participant reaching a mastery criterion of two sessions performed at 100% accuracy within four total sessions of receiving live feedback. For the paired stimulus condition, participants increased four, zero, and 25 percentage points for Jessica, Kerry, and Stacey respectively during the first intervention session from their highest baseline point. Both Jenna and Kerry received the video conferenced feedback for the PS before having a live feedback session. This means that no feedback was provided to them until after their first intervention session was completed. Stacey received a live feedback session with the MSWO prior to receiving video conferenced feedback for the PS session. Kerry and Jessica both took four sessions to reach mastery. Stacey reached mastery in five sessions.

Grouping two performed similarly to grouping one during baseline, with moderate to high appropriate responding across both assessments. Both Alyssa and Simon had higher responding during the PS condition in baseline, similar to all participants in grouping one. Hailey had higher responding in the MSWO condition, with a median of 55.3% (range = 53-58), and a median of 42% in the PS condition (range = 37-46). Simon had a median percentage of 35 in the MSWO condition (range= 29-49), and of 45.8 in the PS condition (range 40-52). Alyssa's median percentage of correct responding was 30.2 for the MSWO (range 25-36) and 39.4 for the PS (range=33-47). Similar to grouping 1, all participants in grouping 2 displayed an immediate increase in correct responding in the condition providing live feedback (PS). An increase in correct responding was seen by an escalation of 38, 27, and 43 percentage points for Hailey, Simon, and Alyssa respectively. Hailey and Alyssa reached mastery within five sessions of receiving feedback, and Simon mastered out in four sessions. For the MSWO condition a smaller increase in correct responding was seen for the initial intervention session, with an increase in two, zero, and one percentage point for Hailey, Simon, and Alyssa respectively. Both Hailey and Simon had received live video feedback on the PS prior to receiving any feedback on the MSWO. Alyssa's first feedback was provided via videoconferencing after performing the MSWO. Hailey and Alyssa both reached mastery criteria within four sessions of receiving feedback, and Simon mastered out in five sessions.

Figure 1. *Percentage of Accurate Responding for Group 1*

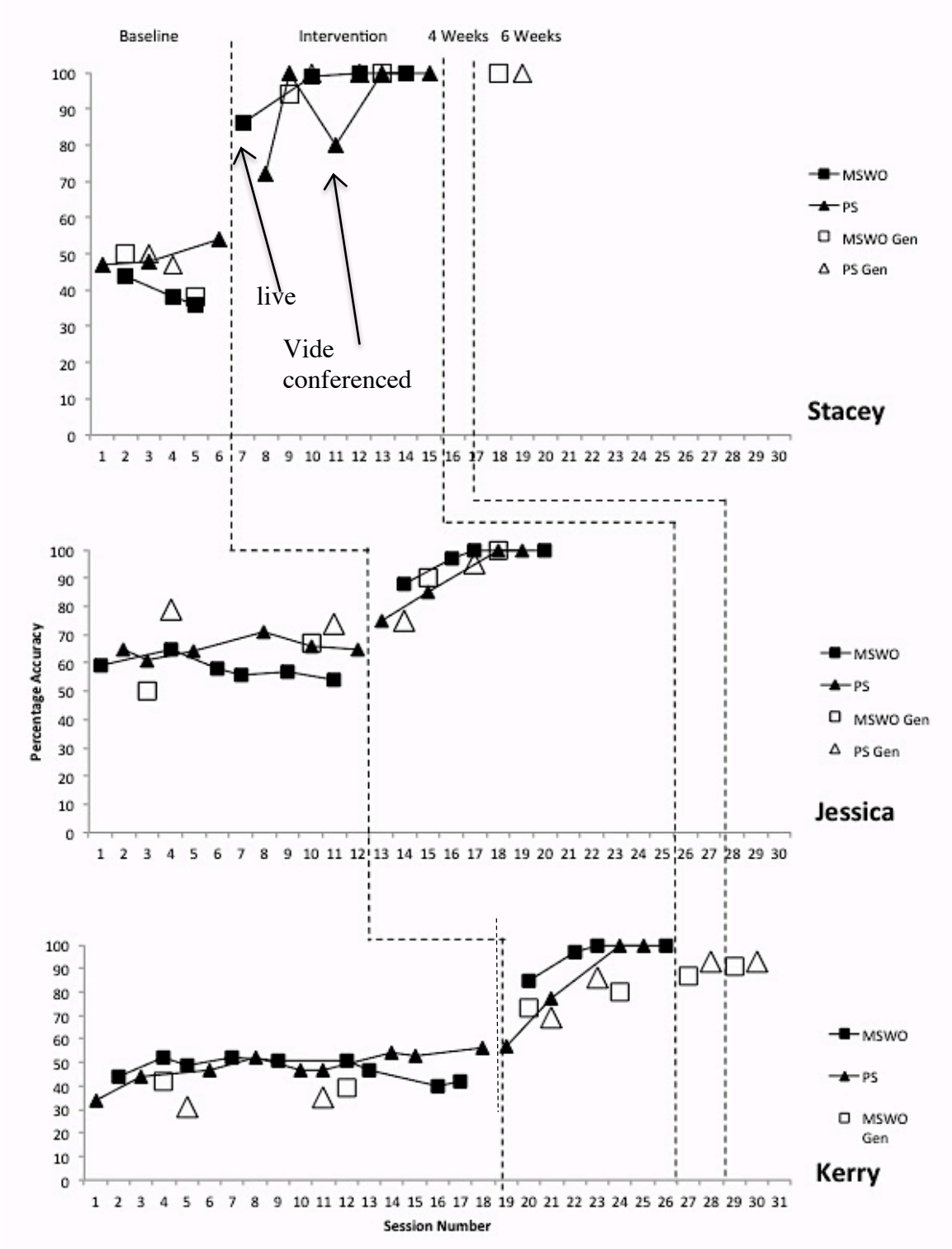
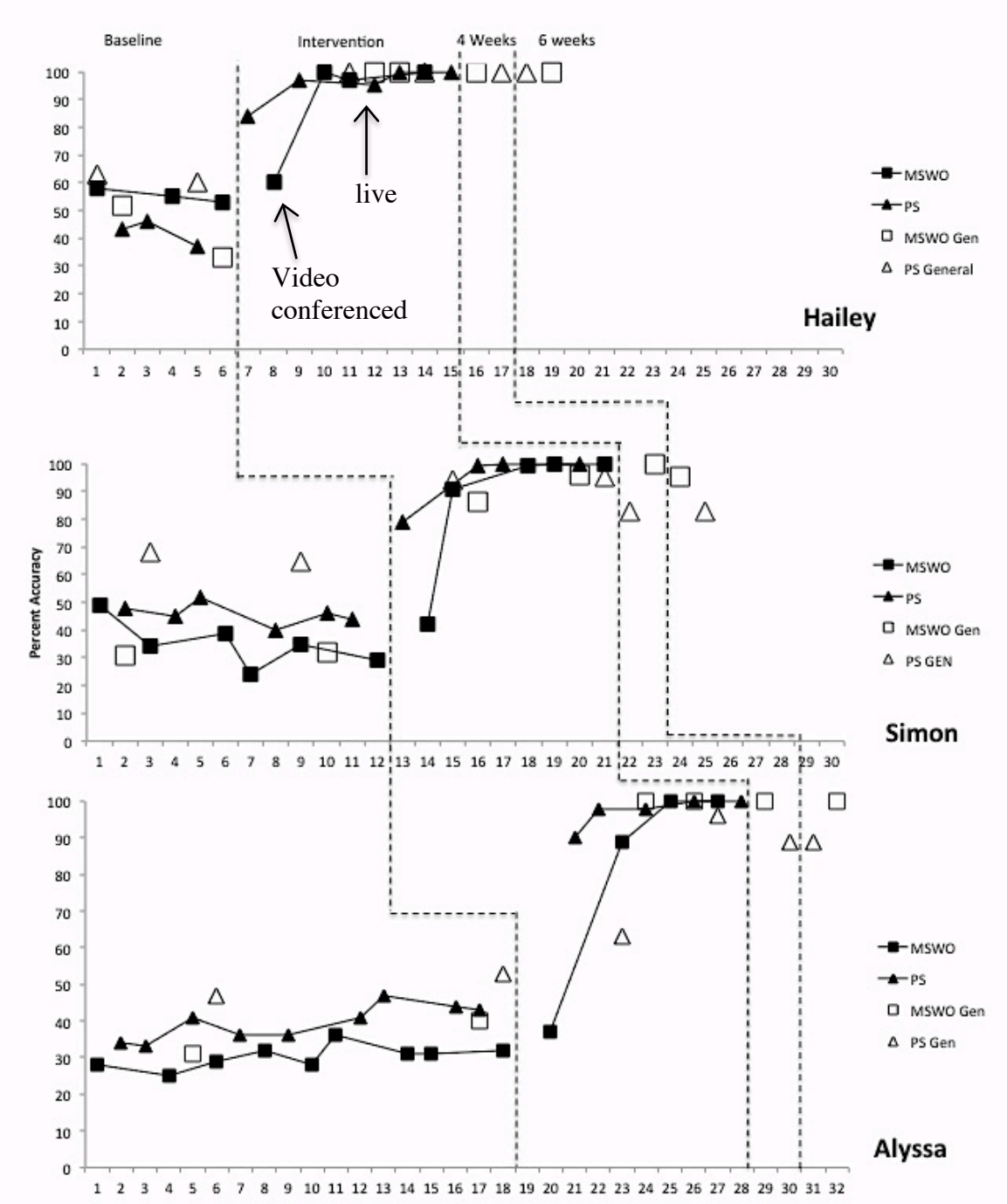


Figure 2. *Percentage of Accurate Responding for Group 2*



Performance on Generalized Preference Assessments

Participants performed generalization probes for both preference assessments across all phases of the study. There was no coaching or use of an error correction procedure for any generalization probes. During baseline, the majority of participants had the same range of correct responses for their generalization probes as they did for their performance with a simulated client. In group one, Kerry's generalization probes were at 39 and 42 percent correct responding for the MSWO and 31 and 35 percent correct responding for the PS. This is comparable to her range of 40-52 percent for the MSWO and 34-56 percent for the PS. Her level of responding increased during the intervention sessions to 69 and 85 percent and 73 and 80 percent correct responding for the PS and MSWO respectively. Stacey responded correctly 47% and 50% of the time for her baseline generalization probes in the PS, which is within the range of her baseline responding of 47-54 percent. During the MSWO she had a slightly higher level of correct responding than in the simulated baseline for one generalization probe (50%), but her other probe was within the same range as her simulate data at 38% (with a simulated data range of 38-44%). During intervention however, Stacey increased her generalization responding to 100% for the PS and a mean of 97% for the MSWO with sessions at 94% and 100% accuracy. Jessica, who had the highest range in grouping 1 during the simulated client sessions also had the highest percentage of correct responding during the generalization sessions. During simulated client responding, Jessica's range was from 61-71% correct for the PS and 54-65% for the MSWO. During generalization sessions, Jessica responded correctly 79 and 74% percent of the time for the PS, and 50 and 67%

of the time for the MSWO, which was within or slightly higher than her responding during the simulated clients. During intervention, she increased to a mean of 85% correct responding for the PS with individual sessions reaching 75 and 95 percent correct. For the MSWO, Jessica achieved 90 and 100 percent correct responding, displaying, like the other participants, the ability to generalize the feedback received during the simulated client sessions to actual clients.

Similarly to group one, participants in group two responded at or higher than their baseline levels of responding in their generalization probes. All participants then showed an increase in correct implementation during intervention generalization probes. Hailey's percentages of accurate responding during baseline were 52 and 33 percent and 60 and 63 percent for the MSWO and the PS respectively. This is comparable to her MSWO baseline range for a simulated client of 53-58% and higher than her PS baseline range of 37-46% accuracy. For intervention this increased to 100% accuracy for all generalization probes across both preference assessments. Simon performed at the 31 and 32% level of accuracy for the MSWO baseline generalization probes, which was within his simulated range of 24-49%. During intervention he increased this to 86 and 96% accuracy. For the PS Simon's generalization probes were at 65 and 68% correct responding, which was slightly higher than his performance with the simulated client. This still increased however to 94 and 95% accuracy during intervention generalization sessions. Finally, Alyssa displayed an accuracy of 31 and 40% during the MSWO generalization probes, which was near her simulated client range of 25-36% accuracy. During intervention generalization probes however Alyssa performed with 100% accuracy. For her PS

probes she showed baseline numbers at 47 and 53% correct responding, which again was just slightly higher than her simulated client range of 33-47%. Alyssa increased this responding during intervention to 63 and 96% accuracy during the PS generalization probes.

Performance on Maintenance Generalization Probes

Maintenance data was collected for four of the six participants at four and six weeks post intervention and at six weeks post intervention for one of the six participants. As with all other phases of generalization probes, there was no feedback provided during the maintenance phase. All participants remained above baseline levels of responding. In grouping one, Stacey continued to perform with 100% accuracy at six weeks post intervention across both assessments. Kerry performed slightly better on the PS than the MSWO, but at consistently high levels for both assessments with an 87 and 93% for the MSWO and PS respectively at four weeks and 91% for the MSWO and a 93% for the PS at six weeks. For grouping two, Hailey continued to perform with 100% accuracy across all maintenance checks. Simon and Alyssa both performed better in the MSWO than the PS condition. Simon performed at 83% accuracy in the PS and a 100% in the MSWO at four weeks and an 83 and 95% for the PS and the MSWO respectively at six weeks. Alyssa performed with 89% accuracy for the PS and 100% accuracy for the MSWO across all maintenance checks.

Table 5. *Selected Responses to Open Ended Social Validity Questionnaire*

I. Benefits of Using Telecommunication
o *The most helpful part of this training was receiving instant feedback*
o *The benefits of distance supervision were immediate feedback, immediate change, immediate reinforcement of the changes*
o *The benefits of distance supervision were that I could complete the assessments on my own time*
II. Disadvantages of Using Telecommunication
o *While I didn't experience this a drawback is that there could have been technology issues*
o *For generalization, I needed more input on data collection itself (how to take data while delivering the assessment) since it was different to me taking data with a child than with an actor.*
III. Preferences of Supervision Modalities
A. Preference for the Use of Live Conferencing
o *I felt the live training (getting feedback while I was performing the task) was the most helpful part of the training, because I could implement change immediately*
o *I preferred Live video conferencing because I got immediate feedback*
B. Preference for the Use of Video Conferencing
o *I preferred video conferencing because I was able to adapt it easier to my schedule*
o *I preferred video conference after the preference assessment - sometimes live feedback made me lose my train of thought*
C. Preference for the Use of Teleconferenced Supervision
o I prefer distance supervision as it allowed me to prioritize what I needed help in rather than receiving general feedback
D. Preference for Face-to Face Supervision
o *I prefer face to face, just because it is what I am more used to and it is easier to facilitate*

Perceptions of the Acceptability of the Use of Telecommunication as a Supervision Model

On a scale of 1-5, with 1 being strongly disagree and 5 being strongly agree, the average rating across participants on all components of the social validity questionnaire ranged from a 4.8-5. Participants rated the use of the error correction procedures, use of distance supervision as a whole, and the outcome of the training at a 5, 4.9, and 4.9

respectively. Participants ranked the use of live feedback and the use of videoconference feedback with screen sharing exactly the same, at a 4.8. These results indicate that the participants found these training methods beneficial and agreed with the format of being provided feedback via all telecommunication platforms.

Responses to the open-ended component of the social validity questionnaire produced 21 responses providing anecdotal information on the use of the two types of telecommunication supervision, the use of telecommunication and in person supervision, and benefits and drawbacks of participation in the study. The most common and the most distinctive replies were sorted into the categories of benefits of teleconferencing, drawbacks, and preferences of supervision modalities. Benefits mentioned included immediate feedback and flexibility with scheduling. Disadvantages included not receiving feedback during generalization sessions and the potential for technology issues. Responses regarding preference of supervision modalities were equally split between preferring live feedback and video conferencing. Those preferring live feedback stated appreciating the ability to get instant feedback and make the change in the moment. Those preferring video conferencing stated preferring the flexibility with scheduling as well as not being interrupted during an action. Additionally, a preference for teleconferencing as a supervision method and traditional face to face was reported at the same rate. Other participants responded with out a preference between the two (i.e., teleconferencing and face-to-face), displaying a lack of partiality to either method by participants in this study. Table 5 presents 11 author chosen open-ended responses to the questions arranged by the above-mentioned categories.

Chapter 5: DISCUSSION AND CONCLUDING COMMENTS

This study evaluated the effects of student performance on the delivery of preference assessments when feedback was delivered through two different teleconferencing strategies. In an attempt to minimize effects of the learning of the preference assessments themselves, participants were divided into two groupings. These groupings received feedback through alternate forms of teleconferencing for each preference assessment type. Initial analysis of the results suggest that there is not a substantial difference between feedback being provided live during a teleconferencing supervision session and between feedback provided post performance, during a video conferenced session where the participant and supervisor were able to screen share and watch the previously recorded session together.

During the first phase of the study participants were provided a written summary of how to complete both preference assessments (Appendix A). Additionally, four of the six participants reported having received exposure to both the MSWO and the PS during one of their courses (Kerry, Jessica, Simon, and Hailey). Regardless of this however, participants were not able to perform assessments at or close to mastery levels during baseline. This finding is consistent with previous literature that sole exposure to information is not enough to teach providers appropriate methodology for preference assessments (Roscoe et al., 2006; Roscoe & Fischer, 2008).

During the baseline phase a ceiling effect was found in that each individual appeared to reach a maximum level of accuracy they were able to achieve without further instruction or feedback. Across participants, the same errors were consistently seen for

both intervention types. During the MSWO, participants consistently erred by not removing or blocking the items after the client made a selection (4 participants), not rearranging the items when presenting the next trial (6 participants), not providing the client access to the toy for the appropriate amount of time (4 participants), not providing the client enough time to choose an item (6 participants), and not providing access only to the first item selected (4 participants). During the PS, the common mistakes included not providing re-sampling when a client did not choose an item (6 participants), not providing the appropriate amount of access time to the item (4 participants), not waiting the appropriate amount of time for a client to make a selection (4 participants), and not reinitiating the same items the first time a client selected two items (3 participants). The commonality of these errors again suggests the need for feedback when teaching preference assessments. Additionally, it displays an adherence to their performance when further information is not provided, suggesting that without feedback and/or reinforcement it is assumed that what one is doing is accurate, and one will continue to perform in this manner unless otherwise told to do so. When looking at this from a technological standpoint, it highlights the concern that distance based education may be challenged without further interaction between faculty and students to promote increased assessment of mastering material, feedback, and reinforcement (Steinweg, Davis, Thomson, 2005).

Once intervention procedures were introduced, an increase in correct responding was found across all participants. Regardless of intervention type, there were no differences found in the number of sessions it took to reach mastery for the MSWO and

the PS. The average number of sessions to reach mastery for the MSWO was 4.2 and was 4.5 for the PS, both with a range of 4-5 sessions. While there was no significant difference seen in the number of sessions to obtain mastery of either of these interventions, baseline accuracy was lower in the MSWO for five of the six participants. This may suggest that the MSWO initially has nuances that were more challenging to grasp by only reading how to perform the assessment. With feedback however, the steps could be mastered at the same rate as the PS, which had higher levels of accuracy in baseline. This may mitigate concerns regarding the use of teleconferencing strategies for more challenging tasks, but future research needs to be done on the topic.

This finding is also consistent when looking at the number of sessions taken to reach criterion across teleconference feedback modalities. There were virtually no differences in the number of sessions it took participants to reach mastery across videoconferences and live streaming feedback sessions. Looking specifically at live streaming feedback, it took participants in group one an average of 4.7 sessions to master the MSWO (range = 4-5). It took participants in group two an average of 4 sessions to master the PS. Looking at videoconference with screen sharing, it took participants in both groups one and two an average of 4.3 sessions to master the PS and MSWO respectively (range = 4-5). Across groups, this made for an average of 4.4 sessions to reach mastery when provided feedback with live streaming and an average of 4.3 sessions to reach mastery when provided feedback with video conferencing. These are only initial results, as more research needs to be done in the area, but are promising in support of the

use of both live streaming and video conferencing with screen sharing as appropriate methods for providing supervision.

While looking at specific data points however, one can see through visual analysis that the initial intervention sessions for video feedback were consistently the lowest intervention data point across all participants. This can be explained in the lack of feedback provided until the end of the session. So, even though participants were being provided feedback at this point, they were not getting this feedback while they were performing the assessment, which allowed them to continue to make the errors they were during baseline. Additionally, only one of three participants who received live feedback prior to video conferenced feedback was able to generalize her mistakes from one assessment to make changes in the second assessment. In other words, after receiving live feedback on the MSWO, Stacey increased her responding during the PS by 18% with no direct intervention on it. Hailey and Simon however, continued to perform at baseline levels with the MSWO, even after having received live feedback on the PS. This is an important finding in that it displays the possibility that not all learners can generalize information within a given topic and make changes to other components based on feedback in one area. When we look at the BACB 4th Edition Task List many components are generalized into one category. For example, performing preference assessments is listed under Section I. Assessment as I-07 Design and conduct preference assessments to identify putative reinforces (Behavior Analyst Certification Board, 2012). Without further analysis of what this behavior means however, individuals may pass supervision requirements without the full knowledge of the different components of

multiple preference assessments. While much more research is needed in this area, it does highlight the need to ensure individuals are being trained to the fullest extent.

The ability to perform these assessments is only as beneficial as the extent to which one can generalize the knowledge and perform with an individual with a disability. When looking at the baseline generalization probes, participants' accuracy in performing each assessment varied from below to above their baseline performance with the simulated client. This in and of itself shows the variability between working with an individual with autism and typical role-playing. There may be many reasons for this variability including (a) the generalization clients performed the preference assessments as expected. This means they chose items right away, did not reach for more than one item, and did not reach for other items. While working with the simulated client participants were exposed to 11 distractor trials for each assessment they performed. Without these distractor trials with their generalization clients, there may have been less opportunity for varied responding on the side of the participant, resulting in higher accuracy. On the other side, (b) when working with the generalization clients, there may have been higher rates of challenging behavior, which made completion of the preference assessment more demanding. Another reason for this differentiation may also have been (c) that the work with a simulated client took place in a quiet and confined room. While all participants were encouraged to perform their preference assessments with their generalization client in this method, two were in schools where there were only dividers between themselves and another classroom, leaving open a lot of opportunities for distraction.

Despite these potential reasons however, all participants showed an increase in generalized responding in the absence of feedback from baseline to intervention. Only two clients did not reach at least 80% accuracy during intervention generalization trials. Kerry, who had 77.5% and 76.5% accuracy in the PS and MSWO respectively, and Alyssa, who reached 100% on the MSWO, but only 79.5% accurate responding for the PS. These also were the two participants who performed the assessments on individuals they did not regularly work with. Not knowing how to respond to the child's challenging behavior during the assessment may have had a factor in this, but it is impossible to know for sure. Future research should look at generalizing to new clientele, as this is an important skill as a BCBA. Additionally, anecdotal responses provided during the generalization intervention assessments showed in particular cases that participants knew what they were doing wrong, but felt challenged to perform correctly in the presence of the generalization client. For example, during her intervention generalization videos Jessica stated, "I was supposed to take that away from him already because it has been 5 seconds, but this is real life and that makes it difficult to do." This again displays a potential inaccuracy between knowledge and performance, as the knowledge on how to correctly perform the assessment was acquired, but the skill to perform with an actual client was still challenged.

In addition to being able to generalize these skills, it is also important to assess the extent of which they are able to maintain. The maintenance data collected on five of the six participants shows the ability to perform both preference assessments with an accuracy of at least 80% at four and six weeks post intervention for all measured

participants. Kerry was the only participant in grouping one who was both able to collect maintenance data and perform at less than 100% accuracy. She did however increase her responding from the generalization probes taken during intervention. Additionally, she performed better on the PS, which was the assessment in which she received feedback via videoconferencing with screen sharing. In grouping two both Simon and Alyssa performed better on the MSWO than the PS at both four and six weeks post intervention. This again is the assessment they received feedback via videoconferencing with screen sharing. While significantly more research needs to be conducted in order to determine the maintenance of these skills over time, these initial results suggest the potential for videoconferencing with screen sharing to assist some learners further in the ability to maintain skills than when feedback provided through live videoconferencing.

The results of the social validity questionnaire indicate that the participants in this study had positive feelings towards the use of teleconferencing as a system for delivering feedback. Interestingly, the results of this questionnaire also suggest that there was a lack of preference for one model over another, including a lack of preference for face-to-face supervision, over a teleconferencing model. These results come without having a face-to-face component of this study. The responses of preference, while split, also appeared to be very individual dependent. Those preferring the videoconferencing with screen sharing stated flexibility in scheduling and having information provided at the end instead of the middle as reasons for preferring this methodology. Those preferring live streaming tended to site the immediacy of the feedback as a reason for this preference. Other individuals had no preference and stated not finding much of a difference between these

methods or between in person supervision. With the potential increase for the use of telecommunication strategies in the field, it may be necessary to determine what factors provide the most preferable outcomes for individual students. Although, that being said, these results also suggest that regardless of the preference, individuals can increase their knowledge and performance by receiving feedback through a variety of platforms.

While the results of this social validity questionnaire correspond with previous measures of social validity for the use of training through telecommunication (e.g., Alnemary et al., 2015; Machalicek et al., 2010; Wainer & Ingersoll, 2015; Vismara et al., 2009; Subramaniam et al., 2016; McDuffie et al., 2013; Machalicek et al., 2016; Heitzman-Powell et al., 2013; Higgins et al., 2017; Gibson et al., 2010; Baharav & Reiser, 2010; Vismara, Young, & Rogers, 2012; Vismara et al., 2013) this was not based on a standardized measure of social validity, making the comparison to previous research difficult at best.

One participant in the open-ended section of social validity questionnaire mentioned a technological concern regarding teleconferencing methods. This participant stated that she did not experience any technological issues, but can see where it may be a concern. While there were no technological issues during the course of this study with any participant, this brings up an interesting limitation that has occurred in the previous literature (Rule et al., 2006; Vickerstaff, Beetge, Copley, 2016). While future research continues to grow on the use of technology as both a training and service delivery platform, it is imperative that a continued focus on the reliability of technology is adhered to.

Additionally, in regards to technology, this study utilized VSee HIPAA Messenger, which provided a secure platform for live streaming, screen sharing, screen recording, and text messaging. Much of the previous research on the use of teleconferencing in special education has used non-HIPAA compliant platforms (i.e., Skype ™ and iChat ™; Vismara et al., 2009; Baharav & Reiser, 2010; Vismara et al., 2012; Wainer & Ingersoll, 2015; McDuffie et al., 2013; Machalicek et al., 2016; Vismara, Young, and Rogers, 2012; Gibson et al., 2010; Alnemary et al., 2015; Machalicek et al., 2010; Wacker et al., 2013; Subramaniam et al., 2016; Panthermuehl & Lechago, 2015; Hetizman-Powell et al., 2013). While there is a convenience factor in using platforms such as these, in that they are easily accessible and most people know how to use them, there is also a security issue. As reported, there were no technological issues with using Vsee, and participants did not report any challenges in understanding or using this platform. As technology continues to grow and more HIPAA compliant platforms become available at low or to no cost to consumers, it is important that the feasibility of these platforms continues to be assessed. It is setting an example for the field about the importance of ensuring the privacy and protection of our clients as we move to more technologically savvy systems of service provision.

Limitations

While the results of this study are positive for the use of both live streaming and video conferencing as a platform for delivering supervision to those working towards obtaining their BCBA, these results can only be interpreted in regards to the limitations of the study. One such limitation is that the majority of the deliverance of preference

assessments was conducted with a simulated client. While this can show an increase in the knowledge and performance of the skill taught over time, it does not show an automatic generalization to clinical practice. While this limitation is somewhat mitigated by the use of generalization probes, these probes were only provided with one client. Numerous clients with a variety of behavioral and responding patterns may have decreased the participants' ability to perform the assessment accurately, regardless of the knowledge base. Additionally, this may factor into the responses on the social validity questionnaire. Since no feedback was provided during generalization sessions, it may be challenging for one to accurately assess their preference for using teleconferencing systems. For example, one may prefer video conferencing with screen sharing while working with actual clients because it provides them the ability to focus on the clients and then receive the information. On the other side, one may prefer the use of live streaming when working with actual clients because it gives them the opportunity to change their behavior in the moment instead of potentially performing inaccurately with the client. Also, there may be a preference for in person supervision when it comes to working with real clients. This is a limitation that has occurred previously in the literature as well (Alnemary et al., 2015; Subramaniam et al., 2016) and future research should focus on the use of these strategies with real clients as opposed to simulated ones.

Another limitation of this study in regards to generalization is that all participants performed both preference assessments on only one client. Previous research suggests that some preference assessment methodologies may be associated with higher levels of challenging behaviors than other methodologies for some individuals (Roane et al., 1998;

Kang et al., 2010). One of the generalization clients who participated in this study was anecdotally observed running away with the reinforcer during the PS assessment. This individual was diagnosed with Social Communication Disorder and was high functioning. The PS may not have been an appropriate model for determining preference for this individual. Having participants who were better matched for each assessment may have yielded different results.

An external factor that may have impacted the results includes the use of a timer/stopwatch. During baseline participants were told they could bring whatever they needed into the room. This was done to simulate a clinical occurrence where you are asked to perform a task without being specifically provided the tools necessary. Only two participants (i.e., Jessica, Hailey) asked if they could use a timer for the assessments during baseline. They were allowed to. Other participants reported counting the times in their head. While two participants confused the amount of time the client received the item for between the MSWO and PS (i.e., Simon, Kerry) during baseline sessions, this still leaves two participants who may have had higher percentages of accurate responding during baseline, if they had used a timer. While this may have impacted the results of baseline, the participants still would not have performed at 100% accuracy, as they continually had other errors in their delivery of the assessments as well. Also, this limitation is somewhat mitigated by the allowance of +/- 1 second for all timed variables on the PS and +/- 3 seconds for all timed variables on the MSWO, as this allowance was provided through all phases of the study in order to account for variability in starting and

stopping of timers as well as challenges in retrieving the items (e.g., challenging behavior, dropped items, etc).

While the variables that data were being collected on remained constant across all phases of the study, there was a limitation on the number of trials produced during generalization sessions compared to sessions with the simulated client. All sessions with the simulated client had data collection on 14 trials, with each trial having the opportunity for four to eight correct or incorrect responses. Additionally, in order to keep opportunities for responding consistent across the MSWO and PS, the MSWO was performed twice during sessions with the simulated client. This was also to keep consistent with previous research utilizing the MSWO and PS as comparable assessments (Roscoe et al., 2006; Roscoe & Fisher, 2008). During generalization sessions however, trial numbers varied across participants based on the number of items that were available to be utilized for each client. Additionally, during generalization sessions the MSWO was only performed one time per session in order to stay consistent with clinical practice and provide only an appropriate assessment time with the client. The number of trials presented during generalization ranged from five to 14, each with four to eight opportunities for correct or incorrect responding.

An additional limitation of the study is that all video conferencing with screen sharing sessions occurred within 24 hours of the initial taped session, with most sessions occurring within an hour of the initial session. Previous research has found that delayed feedback is less effective than immediate feedback (O'Reilly et al., 1992). The use of video conferencing with screen sharing in clinical practice may occur with a longer delay

from the time the session was recorded until the time the supervisor and supervisee are able to watch and discuss it. Without having this delay as a part of the research it is impossible to assess whether or not video conferencing with screen sharing is an effective method when the initial session occurred longer than 24 hours before the video conferenced session.

Also in regards to clinical practice, there are a variety of methods utilized by supervisors to assist in the training of supervisees. This study is limited in that it only used one structured error correction procedure as a way to deliver feedback. The use of other modalities may or may not be as effective when using telecommunication as a supervision platform. For example, behavioral skills training (BST) which includes the use of didactic instruction, modeling, role-play, and feedback has been consistently shown in the research to be an effective method for training staff (Iwata et al., 2000; Jull & Mirenda, 2016). While some components of BST were part of the error correction procedure, others were not. Modeling for example was not utilized. Therefore, whether or not supervision strategies that previous research has shown to be effective would work through live streaming and/or video conferencing with screen sharing has yet to be determined.

A final limitation of this study is that face-to-face supervision was not at all utilized or compared to the technological components of the study. While previous research has shown positive findings for the use of live streaming being as effective of a supervision model as in person training (Vismara et al., 2009; Panthermuehl & Lechago, 2015), comparing this to various teleconferencing platforms may yield different results,

or different preferences among participants. While participants in this study anecdotally had varied results between the teleconferencing systems and in person supervision, occasioning no group preference for a methodology, these results may have been different if in person training was utilized as a format in this study. This may be highlighted, as the supervisor for the study did not supervise the participants in any other setting. So, there anecdotal comparisons of in person and teleconferenced supervision may have been based on individual supervisors instead of modalities.

Future Research

Research in the use of technology as a platform for education is still in its infancy. With that, there are multiple necessary areas for future research, some of which have been mentioned above. Some domains for future research include looking at the use of video conferencing with screen sharing in a more delayed fashion. Since the supervision period for the BACB is two weeks, clinical use of this methodology may potentially have a delay as long as 13 days between the recording of the video and the delivery of the feedback (Behavior Analyst Certification Board, 2012). In order to truly evaluate the benefits of this format, research that includes an increased delay is necessary. Additionally, the research finding the same effects for in person and teleconferenced supervision is still limited (i.e., Vismara et al., 2009; Panthermuehl & Lechago, 2015); therefore research looking at multiple types of teleconferencing in comparison to in person supervision is necessary.

Finally, future research looking at various teaching methodologies would be beneficial in order to determine what limitations, if any, occur when providing

teleconferencing supervision. For example, a variety of strategies are typically utilized to increase supervisees' skills including modeling, role-playing, prompting, etc. A further evaluation of using these methods would assist in determining the true effectiveness of teleconferencing supervision. Along these lines, the consistent errors made in baseline underlines a potential concern for the use of videoconferencing with screen sharing in feedback in that individuals may continue to use the same methodology until feedback is provided. Since feedback in this format is not provided until after the individual has completed a session, they have potentially erred throughout the session without a change in behavior. Previous research has shown that client responding can reinforce staff behaviors (Taylor & Carr, 1992; Hall & Oliver, 1992; Hastings & Remington, 1994). Combining consistent erring with reinforcement of client behaviors may cause an individual to continue to respond inappropriately because they have not received feedback otherwise and are being reinforced based on the clients' behavior. While this study only assessed generalization probes, it would be beneficial for future research on videoconferencing with delayed screen sharing feedback to assess both the time it takes to correct procedures being performed incorrectly, as well as the level of feedback and reinforcement necessary for individuals receiving delayed feedback in this fashion as compared to individuals receiving immediate feedback either in person or through a telecommunication system.

Concluding Statement

In summary, the use of technology is proving to be promising in affording new ways to deliver supervision and training methods. The results of this research suggest

that using live video streaming is as effective of a method for training individuals to conduct preference assessments as is using video conferencing with screen sharing in order to provide feedback after the session occurred. All participants were able to master the implementation of both the MSWO and the PS with feedback provided through both of these platforms. Furthermore, all participants were able to generalize the delivery of these assessments to clients with ASD or developmental disabilities with an increased accuracy after receiving feedback delivered via these technological platforms while working with a simulated client. Additionally, all participants reported positively on social validity measures questioning the use of live streaming and video conferencing as platforms for teaching and delivering feedback.

With the rapid increase in individuals pursuing their BCBA and BCaBA, it is necessary that the field finds and establishes effective and efficient supervision practices (LeBlanc & Luiselli, 2016). More so, the advancement of technology and increase in online education platforms, utilizing teleconferencing practices such as live streaming and video conferencing with screen sharing and video playback may be an instrumental push to assisting individuals in becoming competent and effective behavior analysts. The promising results of this research are only one of the first steps towards that however. In order to truly see a change towards utilizing technology as a platform continued research in this domain is necessary.

APPENDIX A

Information on Preference Assessments

While there are many types of preference assessments, two common ones include the Paired Stimulus (PS) and the Multiple Stimulus Without Replacement (MSWO). Below are the steps for conducting each type of preference assessment (Roscoe & Fischer, 2008; Roscoe et al., 2006). They are both based on using items that you have seen the child show an interest in, that parent or teachers have reported the child having an interest in, or that you, parents, or teachers think the child may have an interest in based on previous experience with the child.

The Paired Stimulus

- Place two items in front of the client and instruct them to "pick one"
    - If the client selects an item within 5 seconds immediately remove the unselected item and provide access to the selected item for 5 seconds
    - If the client selects both items simultaneously or in close sequence with each other remove both items and repeat step one with the same items
    - If the client selects both items a second time remove both items and initiate a new trial (repeat step 1, but with 2 new items)
    - If client does not select an item within 5 seconds allow them to sample each item for 5 seconds each and represent the same trial
    - If client does not select an item a second time within 5 seconds, present a new trial
    - If the client grabs an item that was not presented, block access to this or remove the item and continue with the current trial
- After 5 seconds of access to the item remove the item
- Record the selection for the trial
- Continue trials until every item has been placed with every other item
- Item selected most often is highest preferred

The Multiple Stimulus Without Replacement

- Present each item to the client for 30 seconds
- Present all items in a straight line or small arc in front of the client and instruct the client to "pick one"
- Once the client has made a selection immediately remove all items from table and follow below for all other scenarios
    - If the client selects an item within 30 seconds provide access to that item for 30 seconds
    - if the client selects two items in close sequence the teacher gives the client access to the first item selected for 30 seconds

    - if the client selects two items simultaneously, the teacher blocks access to both items and reinitiates the same trial
    - if the client again selects two items simultaneously the teacher removes all items and initiates a new trial
    - if the client does not select an item within 30 seconds the teacher removes all items and initiates a new trial
    - If the client again does not select an item within 30 seconds the assessment is complete
    - if the client grabs another item while having access to the one selected the teacher blocks access to the item and continues with the current trial
- Record selected item
- After 30 seconds remove the selected item, do not put it back into the array, and rotate the remaining items by putting the item that was farthest right to the farthest left spot and moving each item over accordingly
- Continue trials until there are no remaining items or until child refuses to choose any of the remaining items
- Add the trial numbers during which each item was selected during each session (for example if it was chosen first it is counted as one). Items with the lowest totals have the highest preference

MSWO Data Sheet

Name:
Date:
Session #:

Trial Number

Trial Number	Stimuli Selected
1	
2	
3	
4	
5	
6	
7	

Trial Number

Trial Number	Stimuli Selected
1	
2	
3	
4	
5	
6	
7	

Highest Preferred:

Paired Stimulus Data Sheet

Name:
Date:
Session #:

Trial #	Item Selection
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Highest Preferred:

Scripts Used by Stimulated Client for MSWO

MSWO – Script 1

Trial 1 – Select 1 item approximately 5 seconds after it is presented, interact with that item until it is removed from your hands
Trial 2 – Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item
Trial 3 – Select 1 item approximately 40 seconds after items are presented. If items are not re-presented prior to you being able to select an item, select two items simultaneously, if items are re-presented, select only 1 item
Trial 4 – Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item
Trial 5 – Select one item immediately after it is presented, begin playing with item and after approximately 5 seconds reach for a second item. If access to a second item is blocked continue to play with initial item. If it is not blocked, play with both items until they are removed.
Trial 6 - Select 2 items simultaneously. If this is blocked/items are immediately removed, again select 2 items simultaneously.
Trial 7 – Select 1 item approximately 1 second after it is presented, interact with that item until it is removed from your hands
Trial 8 - Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item
Trial 9 - Select 2 items simultaneously. If this is blocked/items are immediately removed, select only 1 item
Trial 10 - Select 1 item approximately 40 seconds after items are presented. If items are re-presented, select only 1 item
Trial 11 - Select 1 item approximately 25 seconds after it is presented, interact with that item until it is removed from your hands
Trial 12 - Select 1 item immediately after it is presented, begin playing with item and after approximately 5 seconds reach for a second item. If access to a second item is blocked continue to play with initial item. If it is not blocked, play with both items until they are removed.
Trial 13 - Select 2 items simultaneously. If this is blocked/items are immediately removed, again select 2 items simultaneously.
Trial 14 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

MSWO – Script 2

Trial 1 - Select 1 item approximately 1 second after it is presented, interact with that item until it is removed from your hands

Trial 2 - Select 2 items simultaneously. If this is blocked/items are immediately removed, again select 2 items simultaneously.

Trial 3 - Select 1 item approximately 5 seconds after it is presented, interact with that item until it is removed from your hands

Trial 4 - Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item

Trial 5 - Select 2 items simultaneously. If this is blocked/items are immediately removed, select only 1 item

Trial 6 - Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item

Trial 7 – Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

Trial 8 - Select 1 item approximately 10 seconds after it is presented, interact with that item until it is removed from your hands

Trial 9 - Select 2 items simultaneously. If this is blocked/items are immediately removed, again select 2 items simultaneously.

Trial 10 - Select 1 item approximately 40 seconds after items are presented. If items are not re-presented prior to you being able to select an item, select two items simultaneously, if items are re-presented, select only 1 item

Trial 11 - Select 1 item approximately 40 seconds after items are presented. If items are re-presented, select only 1 item

Trial 12 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

Trial 13 - Select 1 item immediately after it is presented, begin playing with item and after approximately 5 seconds reach for a second item. If access to a second item is blocked continue to play with initial item. If it is not blocked, play with both items until they are removed.

Trial 14 - Select 1 item approximately 25 seconds after it is presented, interact with that item until it is removed from your hands

MSWO – Script 3

Trial 1 - Select 1 item approximately 25 seconds after it is presented, interact with that item until it is removed from your hands

Trial 2 - Select 2 items simultaneously. If this is blocked/items are immediately removed, again select 2 items simultaneously.

Trial 3 - Select 1 item approximately 40 seconds after items are presented. If items are re-presented, select only 1 item

Trial 4 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

Trial 5 - Select 1 item approximately 10 seconds after it is presented, interact with that item until it is removed from your hands

Trial 6 - Select 1 item immediately after it is presented, begin playing with item and after approximately 5 seconds reach for a second item. If access to a second item is blocked continue to play with initial item. If it is not blocked, play with both items until they are removed.

Trial 7 - Select 1 item approximately 40 seconds after items are presented. If items are not re-presented prior to you being able to select an item, select two items simultaneously, if items are re-presented, select only 1 item

Trial 8 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

Trial 9 - Select 1 item approximately 1 second after it is presented, interact with that item until it is removed from your hands

Trial 10 - Select 2 items simultaneously. If this is blocked/items are immediately removed, select only 1 item

Trial 11 - Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item

Trial 12- Select 1 item approximately 5 seconds after it is presented, interact with that item until it is removed from your hands

Trial 13 - Select one item immediately after it is presented, begin playing with item and after approximately 5 seconds reach for a second item. If access to a second item is blocked continue to play with initial item. If it is not blocked, play with both items until they are removed.

Trial 14 - Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item

Scripts Used by Simulated Client for Paired Stimulus

PS – Script 1

Trial 1 – Select 1 item immediately after items are presented
Trial 2 - Select 1 item approximately 8 seconds after items are presented
Trial 3 – Select both items simultaneously, if items are represented again select one item
Trial 4 - Do not select an item unless approximately 10 seconds has passed.
Trial 5 – Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item
Trial 6 – Do not select an item unless approximately 10 seconds has passed.
Trial 7 – Select both items simultaneously, if items are represented again select only 1 item
Trial 8 – Select 1 item approximately 8 seconds after items are presented
Trial 9 – Select one item and then immediately select second item, if items are represented again select one item
Trial 10 - Do not select an item unless approximately 10 seconds has passed
Trial 11 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If item is blocked/removed select one appropriate item
Trial 12 - Do not select an item unless approximately 10 seconds has passed
Trial 13 – Select one item and then immediately select second item, if items are presented again select only 1 item
Trial 14 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented select both items simultaneously, if items are represented again select one appropriate item
Trial 15 - Select 1 item approximately 2 seconds after items are presented

PS – Script 2

Trial 1 - Select both items simultaneously, if items are represented again select only 1 item
Trial 2 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If blocked/item removed select one appropriate item
Trial 3 -Do not select an item unless approximately 10 seconds has passed.
Trial 4 -Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If blocked/removed select 1 item
Trial 5 - Do not select an item unless approximately 10 seconds has passed.
Trial 6 - Select 1 item immediately after items are presented
Trial 7 -Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If blocked/removed select 1 appropriate item
Trial 8 - Select 1 item approximately 8 seconds after items are presented
Trial 9 - Do not select an item unless approximately 10 seconds has passed.
Trial 10 - Select both items simultaneously, if items are represented again select only 1 item
Trial 11 - Do not select an item unless approximately 10 seconds has passed.
Trial 12 - Select 1 item approximately 2 seconds after items are presented
Trial 13 - Select one item and then immediately select second item, if items are presented again select only 1 item
Trial 14 - Select one item and then immediately select second item, if items are represented again select both items simultaneously, if items are presented a third time select only 1 item
Trial 15 - Select 1 item approximately 2 seconds after items are presented

PS – Script 3

Trial 1 - Do not select an item unless approximately 10 seconds has passed.
Trial 2 - Select 1 item immediately after items are presented
Trial 3 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If blocked/removed chose one appropriate item
Trial 4 -Do not select an item unless approximately 10 seconds has passed.
Trial 5 - Select 1 item approximately 8 seconds after items are presented
Trial 6 - Select one item and then immediately select second item, if items are represented again select both items simultaneously, if items are presented a third time select only 1 item
Trial 7 -Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If blocked/removed select 1 appropriate item
Trial 8 - Select both items simultaneously, if items are represented again select both items, if represented a third time select only 1 item
Trial 9 - Select 1 item approximately 2 seconds after items are presented
Trial 10 - Select one item and then immediately select second item, if items are presented again select only 1 item
Trial 11 - Do not select an item unless approximately 10 seconds has passed.
Trial 12 - Select 1 item approximately 5 seconds after items are presented
Trial 13 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item
Trial 14 - Do not select an item unless approximately 10 seconds has passed
Trial 15 - Select 1 item approximately 2 seconds after items are presented

APPENDIX B

Expected Participant Behaviors During Delivery of Preference Assessments

Data Collection Sheet of - Multiple Stimulus Without Replacement

Place a plus for each trial implemented correctly under each step and a minus for each trial implemented incorrectly under each step. Place an X for any unused trials. Add additional notes on any prompts and instruction that were provided.
*all occurrences of 30 seconds are provided with a +/- of 3 seconds

1. teacher presents each item to the client for 30 seconds
Circle: **Y or N**

2. teacher presents all items in a straight line in front of the client and instructions the client to "pick one." After the first trial the teacher appropriately rotates the remaining items

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

3(a). if the client selects an item within 30 seconds the teacher provides access to that item for 30 seconds

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

3(b). if the client selects two items in close sequence the teacher gives the client access to the first item selected for 30 seconds

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**

T11	**T12**	**T13**	**T14**						

Additional notes:

3(c) if the client selects two items simultaneously, the teacher blocks access to both items and reinitiates the same trial

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

3(d). if the client again selects two items simultaneously the teacher removes all items and initiates a new session

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

3(e) if the client does not select an item within 30 seconds the teacher removes all items and initiates a new trial

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

3(f) if the client grabs another item while having access to the one selected the teacher blocks access to the item and continues with the current trial

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

4. The teacher immediately removes/blocks access to all items once an item was chosen

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

5. After 30 seconds the teacher removes the selected item

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

6. The trainee accurately recorded the client selection for each trial
   Circle: **Y** or **N**
7. At end, the trainee accurately summarized the client data, including obtaining a selection percentage and corresponding rank for each item
   Circle: **Y or N**

Data Collection Sheet - Paired Stimulus

Place a plus for each trial implemented correctly under each step and a minus for each trial implemented incorrectly under each step. Place an X for any unused trials. Add additional notes on any prompts and instruction that were provided.
*All occurrences of 5 seconds are provided an allowance of +/- 1 second

1. teacher presents each item to the client for 5 seconds
   Circle: **Y or N**

2. teacher places two items in front of the client and instructs the client to "pick one"

T 1	T 2	T 3	T 4	T 5	T 6	T 7	T 8	T 9	T 10
T11	T12	T13	T14						

Additional notes:

3(a). Once a client selects an item the teacher immediately removes the unselected item

T 1	T 2	T 3	T 4	T 5	T 6	T 7	T 8	T 9	T 10
T11	T12	T13	T14						

Additional notes:

3(b). If the client selected both items simultaneously or in close sequence with each other the teacher removes both items and reinitiates the same trial

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

3 (b2). If the client did not select an item within 5 seconds or selected both items a second time, the teacher removes both items and initiates the next trial

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

3(c) If the client grabbed an item that was not presented, the teacher blocked access to or removed the item and continued with the current trial

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

3(d1). If the client does not select an item within 5 seconds the participant removes both items and precedes to step d2

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

3(d2)If the client does not select an item within 5 seconds the participant provides access to the first item for 5 seconds and precedes to step d3

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

3(d3) If the client does not select an item within 5 seconds the participant provides access to the second item for 5 seconds and precedes to step d4

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

3(d4) If the client does not select an item within 5 seconds the participant reinitiates the same trial

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

3(d5) If the client again does not select an item within 5 seconds the participant initiates the next trial

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

4. after 5 seconds the teacher removes the item

T 1	**T 2**	**T 3**	**T 4**	**T 5**	**T 6**	**T 7**	**T 8**	**T 9**	**T 10**
T11	**T12**	**T13**	**T14**						

Additional notes:

5. The participant accurately recorded the client selection for each trial
   Circle **Y** or **N**
6. At end, teacher accurately obtains a selection percentage and corresponding ranks for each item
   Circle: **Y or N**

Fidelity Checklist for Supervision Model

Tally for each step implemented correctly for steps 1-3. Mark Correct or Incorrect for the entire session for step 4

Live Teleconferencing

Supervisor Actions	Correct	Incorrect
1. Supervisor interrupts action and acknowledges an error occurred		
2. If the participant corrects the error on their own the supervisor provides verbal praise		
3. If the participant is not aware that there is an error, is unsure of what the error is, or continues to perform incorrectly the supervisor provides correct instructions and verbal praise when step is completed correctly		
4. Supervisor provides reinforcement in the form of verbal praise at the completion of the assessment		

Shared Screen Video Conferencing

Supervisor Actions	Correct	Incorrect
1. Supervisor paused video and provided an acknowledgement of an error		
2. If participant recognized the error on their own the supervisor instructed them to state what they should have done correctly (if participant doesn't on their own) and provided verbal reinforcement		
3. If the participant responds incorrectly or is unsure of how to respond the supervisor states the correct step and asks clarification question to ensure understanding		
4. Supervisor provides reinforcement in the form of verbal praise at the completion of the assessment		

Fidelity Checklist for Actor Script Implementation

MSWO – Script 1

Mark + if actor performs all steps correctly and – if any steps/part of steps are missed. All timing was given a +/- 1 second

Trial 1 – Select 1 item approximately 5 seconds after it is presented, interact with that item until it is removed

☐

Trial 2 – Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item

☐

Trial 3 – Select 1 item approximately 40 seconds after items are presented. If items are not re-presented prior to you being able to select an item, select two items simultaneously, if items are re-presented, select only 1 item

☐

Trial 4 – Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

☐

Trial 5 – Select one item immediately after it is presented, begin playing with item and after approximately 5 seconds reach for a second item. If access to a second item is blocked continue to play with initial item. If it is not blocked, play with both items until they are removed.

☐

Trial 6 - Select 2 items simultaneously. If this is blocked/items are immediately removed, again select 2 items simultaneously.

☐

Trial 7 – Select 1 item approximately 1 second after it is presented, interact with that item until it is removed from your hands

☐

Trial 8 - Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item

☐

Trial 9 - Select 2 items simultaneously. If this is blocked/items are immediately removed, select only 1 item

☐

Trial 10 - Select 1 item approximately 40 seconds after items are presented. If items are re-presented, select only 1 item

☐

Trial 11 - Select 1 item approximately 25 seconds after it is presented, interact with that item until it is removed from your hands

☐

Trial 12 - Select 1 item immediately after it is presented, begin playing with item and after approximately 5 seconds reach for a second item. If access to a second item is blocked continue to play with initial item. If it is not blocked, play with both items until they are removed.

☐

Trial 13 - Select 2 items simultaneously. If this is blocked/items are immediately removed, again select 2 items simultaneously.

☐

Trial 14 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

☐

Total: /14 =

MSWO – Script 2

Mark + if actor performs all steps correctly and – if any steps/part of steps are missed. All timing was given a +/- 1 second

Trial 1 - Select 1 item approximately 1 second after it is presented, interact with that item until it is removed

☐

Trial 2 - Select 2 items simultaneously. If this is blocked/items are immediately removed, again select 2 items simultaneously.

☐

Trial 3 - Select 1 item approximately 5 seconds after it is presented, interact with that item until it is removed

☐

Trial 4 - Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item

☐

Trial 5 - Select 2 items simultaneously. If this is blocked/items are immediately removed, select only 1 item

☐

Trial 6 - Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item

☐

Trial 7 – Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

☐

Trial 8 - Select 1 item approximately 10 seconds after it is presented, interact with that item until it is removed from your hands

☐

Trial 9 - Select 2 items simultaneously. If this is blocked/items are immediately removed, again select 2 items simultaneously.

☐

Trial 10 - Select 1 item approximately 40 seconds after items are presented. If items are not re-presented prior to you being able to select an item, select two items simultaneously, if items are re-presented, select only 1 item

☐

Trial 11 - Select 1 item approximately 40 seconds after items are presented. If items are re-presented, select only 1 item

☐

Trial 12 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

☐

Trial 13 - Select 1 item immediately after it is presented, begin playing with item and after approximately 5 seconds reach for a second item. If access to a second item is blocked continue to play with initial item. If it is not blocked, play with both items until they are removed.

☐

Trial 14 - Select 1 item approximately 25 seconds after it is presented, interact with that item until it is removed from your hands

☐

Total: /14 =

MSWO – Script 3

Mark + if actor performs all steps correctly and – if any steps/part of steps are missed. All timing was given a +/- 1 second

Trial 1 - Select 1 item approximately 25 seconds after it is presented, interact with that item until it is removed

☐

Trial 2 - Select 2 items simultaneously. If this is blocked/items are immediately removed, again select 2 items simultaneously.

☐

Trial 3 - Select 1 item approximately 40 seconds after items are presented. If items are re-presented, select only 1 item

☐

Trial 4 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

☐

Trial 5 - Select 1 item approximately 10 seconds after it is presented, interact with that item until it is removed from your hands

☐

Trial 6 - Select 1 item immediately after it is presented, begin playing with item and after approximately 5 seconds reach for a second item. If access to a second item is blocked continue to play with initial item. If it is not blocked, play with both items until they are removed.

☐

Trial 7 - Select 1 item approximately 40 seconds after items are presented. If items are not re-presented prior to you being able to select an item, select two items simultaneously, if items are re-presented, select only 1 item

☐

Trial 8 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

☐

Trial 9 - Select 1 item approximately 1 second after it is presented, interact with that item until it is removed from your hands

☐

Trial 10 - Select 2 items simultaneously. If this is blocked/items are immediately removed, select only 1 item

☐

Trial 11 - Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item

☐

Trial 12- Select 1 item approximately 5 seconds after it is presented, interact with that item until it is removed from your hands

☐

Trial 13 - Select one item immediately after it is presented, begin playing with item and after approximately 5 seconds reach for a second item. If access to a second item is blocked continue to play with initial item. If it is not blocked, play with both items until they are removed.

☐

Trial 14 - Select 1 item and then immediately select another item. If the items are re-presented, select only 1 item

☐

Total: /14 =

PS – Script 1

Mark + if actor performs all steps correctly and – if any steps/part of steps are missed. All timing was given a +/- 1 second

Trial 1 – Select 1 item immediately after items are presented

☐

Trial 2 - Select 1 item approximately 8 seconds after items are presented

☐

Trial 3 – Select both items simultaneously, if items are represented again select one item

☐

Trial 4 - Do not select an item unless approximately 10 seconds has passed.

☐

Trial 5 – Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

☐

Trial 6 – Do not select an item unless approximately 10 seconds has passed.

☐

Trial 7 – Select both items simultaneously, if items are represented again select only 1 item

☐

Trial 8 – Select 1 item approximately 8 seconds after items are presented

☐

Trial 9 – Select one item and then immediately select second item, if items are represented again select one item

☐

Trial 10 - Do not select an item unless approximately 10 seconds has passed

☐

Trial 11 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If item is blocked/removed select one appropriate item

☐

Trial 12 - Do not select an item unless approximately 10 seconds has passed

☐

Trial 13 – Select one item and then immediately select second item, if items are presented again select only 1 item

☐

Trial 14 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented select both items simultaneously, if items are represented again select one appropriate item

☐

Total: /14 =

PS – Script 2

Mark + if actor performs all steps correctly and – if any steps/part of steps are missed. All timing was given a +/- 1 second

Trial 1 - Select both items simultaneously, if items are represented again select only 1 item

☐

Trial 2 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If blocked/item removed select one appropriate item

☐

Trial 3 -Do not select an item unless approximately 10 seconds has passed.

☐

Trial 4 -Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If blocked/removed select 1 item

☐

Trial 5 - Do not select an item unless approximately 10 seconds has passed.

☐

Trial 6 - Select 1 item immediately after items are presented

☐

Trial 7 -Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If blocked/removed select 1 appropriate item

☐

Trial 8 - Select 1 item approximately 8 seconds after items are presented

☐

Trial 9 - Do not select an item unless approximately 10 seconds has passed.

☐

Trial 10 - Select both items simultaneously, if items are represented again select only 1 item

☐

Trial 11 - Do not select an item unless approximately 10 seconds has passed.

☐

Trial 12 - Select 1 item approximately 2 seconds after items are presented

☐

Trial 13 - Select one item and then immediately select second item, if items are presented again select only 1 item

☐

Trial 14 - Select one item and then immediately select second item, if items are represented again select both items simultaneously, if items are presented a third time select only 1 item

☐

Total: /14 =

PS – Script 3

Mark + if actor performs all steps correctly and – if any steps/part of steps are missed. All timing was given a +/- 1 second

Trial 1 - Do not select an item unless approximately 10 seconds has passed.

☐

Trial 2 - Select 1 item immediately after items are presented

☐

Trial 3 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If blocked/removed chose one appropriate item

☐

Trial 4 -Do not select an item unless approximately 10 seconds has passed.

☐

Trial 5 - Select 1 item approximately 8 seconds after items are presented

☐

Trial 6 - Select one item and then immediately select second item, if items are represented again select both items simultaneously, if items are presented a third time select only 1 item

☐

Trial 7 -Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If blocked/removed select 1 appropriate item

☐

Trial 8 - Select both items simultaneously, if items are represented again select both items, if represented a third time select only 1 item

☐

Trial 9 - Select 1 item approximately 2 seconds after items are presented

☐

Trial 10 - Select one item and then immediately select second item, if items are presented again select only 1 item

Trial 11 - Do not select an item unless approximately 10 seconds has passed.

Trial 12 - Select 1 item approximately 5 seconds after items are presented

Trial 13 - Select an item that is not in the stimulus array (i.e., a pen, paper, etc.). If items are re-presented, select 1 appropriate item

Trial 14 - Do not select an item unless approximately 10 seconds has passed

Total: /14 =

APPENDIX C

Experience Feedback Questionnaire

1. The technology used for videoconferencing with screen sharing worked appropriately

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

2. The technology used for live teleconferencing worked appropriately

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

3. The corrective feedback I received was appropriate and I felt it assisted in my learning

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

4. The reinforcement I received was an appropriate amount and I felt it assisted in my learning

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

5. I felt that videoconferencing with screen sharing was an effective method for learning to perform preference assessments

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

6. I felt that live teleconferencing was an effective method for learning to perform preference assessments

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

7. I think the use of distance supervision would be effective for others in my class

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

8. I felt the questions asked of me by my supervisor were helpful in assisting me with understanding how to deliver preference assessments

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

9. The technology used was at a high standard (e.g., clear picture, fast, etc)

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

10. I have a better understanding of how to perform preference assessments than before

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

11. I would use videoconferencing with screen sharing as a supervision method for learning other behavioral methods

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

12. I would use live teleconferencing as a supervision method for learning other behavioral methods

1	**2**	**3**	**4**	**5**
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

13. The feedback I received helped me to learn at a quick pace

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree

14. What was the most helpful part of this training?

15. What was the least helpful part of this training?

16. What were the benefits distance supervision?

17. What were the drawbacks of distance supervision?

18. Which type of distance supervision did you prefer and why?

19. How did distance supervision compare to face-to-face supervision? Which would you prefer and why?

20. Any additional comments

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